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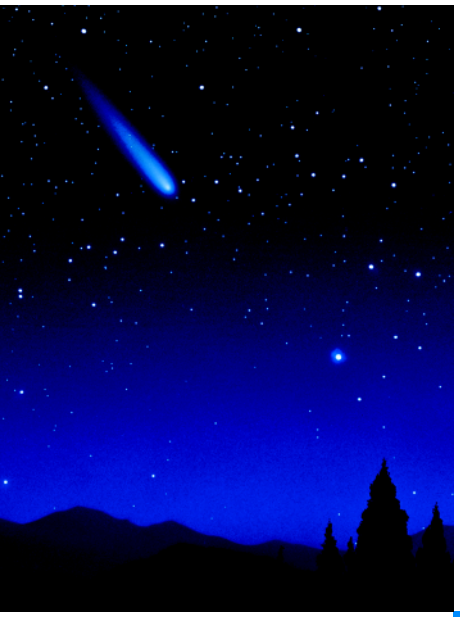
2 Systems



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Ch. 9 3SF2 cable-operated switches
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SIRIUS Modular System
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1) See Catalog FS 10 "Sensor Technology"

2) See Catalog IK PI "Industrial Communication for Automation and Drives"

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Introduction

Overview

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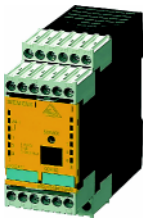
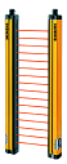
AS-Interface / ASIsafe			
	ASIsafe enables the integration of safety-oriented components in an AS-Interface network, for example: • EMERGENCY-STOP pushbuttons • Protective door switches • Safety light arrays The simple wiring of AS-Interface, which is a major advantage, is maintained.		
 Safety monitors	**AS-Interface safety monitors** • Key element of ASIsafe • Monitors safe participants and links safety inputs • Ensures safe disconnection • Modular construction according to individual requirements • Available with one or two release circuits with 2-channel configuration • New version of "Expanded safety monitor" with expanded RAM and integrated ON- and OFF-delay and pulse functions Your advantage: Easy to configure safety functions up to Category 4	**3RK1**	2/14
 K45F K60F S22.5F (SlimLine)	**AS-Interface safety modules** • Complete portfolio of ASIsafe modules • Degree of protection IP65/IP67 or IP20 • Two inputs in Category 2 or one input in Category 4 • Two standard outputs are available on the module in addition Your advantage: Easy integration of safe signals, be it in the cabinet or in the field	**3RK1**	2/15
 Position switches	**Position switches and cable-operated switches** • Degree of protection IP65 • Direct connection of position switches or cable-operated switches for detection of safe signals • Available with separate actuator and tumbler • Molded-plastic or metal enclosures Your advantage: No more conventional wiring of safety functions required	**3SF2, 3SF3**	Ch. 8 / Ch. 9
 Cable-operated switches			
 Light curtains and arrays	**Light curtains/arrays and laser scanners** • Degree of protection IP65 • Direct and safe connection to AS-Interface • Up to Category 3 (laser scanners) or Category 4 (light arrays/curtains) Your advantage: Direct connection of active and optical protection for persons to ASIsafe	**3SF7**	See Catalog FS 10 "Sensor Technology"

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		Order No.	Page
EMERGENCY-STOP front plate	**AS-Interface EMERGENCY-STOP pushbuttons** • Degree of protection IP65/IP67 • EMERGENCY-STOP directly on AS-Interface using integrated modules • Metal or plastic version Your advantage: Easy direct connection of service-proven operator controls to ASIsafe	**3SF5**	Ch. 9
Masters			
	The AS-Interface master creates the connection to higher-level control systems. It automatically organizes the data traffic on the AS-Interface cable and sees not only to querying the signals but also to performing the parameter setting, monitoring and diagnostics functions.		
CP 343-2 P for SIMATIC S7-300	**Masters for SIMATIC** • Connection of up to 62 AS-Interface slaves • Integrated analog value transfer • Configuring and uploading of AS-Interface configuration in STEP 7 with S7-300 Master • No configuration required • Easy operation in the input/output address range • Monitoring of the supply voltage on the AS-Interface shaped cable Your advantage: Easy connection to SIMATIC S7-300, to SIMATIC S7-200 or to SIMATIC ET 200X	**6GK7**	2/17
CP 243-2 for SIMATIC S7-200			
AS-Interface / Routers			
	As an alternative to the CPs, which are plugged directly in the controller it is also possible to use a gateway/link as AS-Interface master – at any position beneath the PROFIBUS DP or Industrial Ethernet.		
IE/AS-i LINK PN IO	**Routers** • Degree of protection IP20 • PROFIBUS slave or PROFINET IO device and AS-Interface master (single or double master in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO) • Connection of up to 62 AS-Interface slaves • Integrated ground-fault monitoring (in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO) • User-friendly local diagnostics and local start-up by means of a full graphic display and control keys or through a web interface with a standard browser (in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO) • No configuration of the CP for AS-Interface required • Integrated analog value transfer • Configuring and uploading of AS-Interface configuration in STEP 7 possible • User-friendly selection of AS-Interface slaves Your advantage: Optimum transition to PROFIBUS or Industrial Ethernet, integrated in STEP 7	**6GK1**	2/21
DP/AS-i LINK Advanced			
DP/AS-Interface Link 20E			

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Introduction

		Order No.	Page
AS-Interface / Slaves			
	Slaves contain the AS-Interface electronics and connection options for sensors and actuators in the field and in the cabinet. A total of up to 62 slaves can be connected to one bus. The slaves then exchange their data in cyclic mode with a control module (master).		
K20 digital module K45 digital module K60 digital module	**Field modules / Digital I/O modules IP67 - K20, K45 and K60** • Degree of protection IP65/IP67 • Modules available with degree of protection up to IP68/69K • ATEX-certified modules available for EX Zone 22 • Connection sockets in M8/M12 • Up to eight inputs and four outputs • A/B technology available • Contacting protected against polarity reversal • Standard rail mounting and wall mounting possible • Mounting of the module on the base plate using just one screw • Diagnostics LEDs Your advantage: Reduction of mounting and start-up times by up to 40 %	**3RK1, 3RK2**	2/29, 2/34, 2/36
K60 analog module	**Field modules / analog I/O modules IP67 - K60** • Degree of protection IP65/IP67 • Detects or transmits analog signals locally • 2/4-channel • Input modules for up to four sensors with current signal, sensors with voltage signal or sensors with thermal resistor • Output modules for current or voltage Your advantage: Easy integration of analog values	**3RK1**	2/40
SlimLine F90 module Flat module	**Cabinet modules** • Degree of protection IP20 • No M12 connectors required for connection • Up to 16 inputs • Slim design of the SlimLine modules with width from 22.5 mm • Removable, finger-safe terminal blocks that cannot be mixed up (SlimLine) • Flat design of the flat modules for small control cabinets and confined conditions • Connection with screw-type or spring-loaded terminals • Standard rail mounting and wall mounting possible • Diagnostics LEDs Your advantage: Modules enable use in cabinets and small local control cabinets	**3RG9, 3RK1**	2/43

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		Order No.	Page
Counter modules	**Modules with special functions / Counter modules** • Degree of protection IP20 • For evaluation of pulses • Connection with screw-type or spring-loaded terminals Your advantage: Evaluation of pulses which exceed even the clock frequency of AS-Interface	**3RK1**	2/49
Ground-fault detection modules	**Modules with special functions / Ground-fault detection modules** • Degree of protection IP20 • Display using LEDs • Two signal outputs Your advantage: Automatic diagnostics of ground faults on AS-Interface	**3RK1**	2/50
Overvoltage protection modules	**Modules with special functions / Overvoltage protection modules** • Degree of protection IP67 • Discharge through ground cable with oil-proof outer sheath • Protection at transition of lightning protection zones Your advantage: The AS-Interface overvoltage protection module protects downstream AS-Interface devices or individual sections in AS-Interface networks from conducted overvoltages	**3RK1**	2/50
Compact starters	**Motor starters / Compact starters (400 V AC)** • Degree of protection IP65/IP67 • Up to 5.5 kW at 400/500 V AC • Electromechanical or solid-state design • Optional with brake contact Your advantage: No local control cabinets required thanks to completely factory-wired load feeder with IP65 protection	**3RK1**	Ch. 6
Motor starters	**Motor starters / Motor starters (24 V DC)** • Degree of protection IP65/IP67 • Direct-on-line starters, double starters or reversing starters • Up to 70 W • Quick stop function Your advantage: Simple motor starter in service-proven module construction for 24 V DC motors	**3RK1**	Ch. 6
ECOFAST motor starters	**Motor starters / ECOFAST motor starters and soft starters** • Degree of protection IP65/IP67 • Standardized interfaces according to ECOFAST Specification (DESINA-conform) • Mechanical or solid-state soft switching function Your advantage: Less space required in the cabinet, the starters can be installed near the motor or be plugged on the motor	**3RK1**	Ch. 6
Complete load feeder	**Motor starters / Load feeders** • Degree of protection IP20 • Available completely factory-wired or as individual components • Performance range up to max. 7.5 kW • Power bus in combination with busbar system (> 200 A) Your advantage: Completely assembled load feeders simplify applications with AS-Interface	**3RK1**	Ch. 6

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Introduction

		Order No.	Page
Pushbuttons	**Pushbuttons and indicator lights** • Modular construction according to individual requirements • Metal and plastic version • A/B technology • With LEDs or incandescent lamps Your advantage: Complete 3SB3 operating system with simple AS-Interface connection for your plant	**3SB3**	Ch. 9
Signaling columns	**Signaling columns** • Many optical and acoustic elements can be combined • A/B slaves according to AS-Interface Specification 2.1 • Up to three signaling elements can be connected using an adapter element • With LEDs or incandescent lamps Your advantage: Signaling columns for monitoring production sequences and for visual or acoustic warnings in emergency situations, with easy AS-Interface connection	**8WD4**	Ch. 9
Connections for LOGO!	**AS-Interface connection for LOGO!** • AS-Interface slave for the connection of LOGO! • Distributed controller functionality • Four inputs / four outputs (virtual) Your advantage: Intelligence can be used locally	**3RK1**	2/52
AS-Interface / Power supply units			
	AS-Interface power supply units generate a controlled direct voltage of 30 V DC with high stability and low residual ripple, working according to the principle of a primary switchgear. They are an integral component of the AS-Interface network and enable the simultaneous transmission of data and energy on one cable.		
IP20, 3 A	**Power supply units** *Power supply units with degree of protection IP20:* • With wide performance spectrum from 2.4 to 8 A • Less space required thanks to compact dimensions • Easy and quick installation • Certified for global use • Integrated ground-fault and overload detection save the need for additional components and make applications reliable • Diagnostics memory, remote indication and remote reset allow fast detection of faults in the system • Removable terminal blocks reduce downtimes • The ultra-wide input range enables single- and two-phase applications (8 A version) Your advantage: Optimum performance for each application.	**3RX9**	2/53
IP20, 8 A			
AS-Interface / Transmission media			
	AS-Interface shaped cable for connection of network stations.		
Shaped cables	**AS-Interface shaped cables** • No polarity reversal thanks to trapezoidal shape • Cables made of optimized material for different operating conditions • Special version according to UL Class 2 available Your advantage: Fast replacement and connection to AS-Interface by piercing method	**3RX9**	2/55

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AS-Interface / System components and accessories

Accessories comprise tools for mounting, installation and operation as well as individual components.

		Order No.	Page
Repeaters (6GK1 210-0SA00)	**Repeater/extender and extension plug** • Extension of an AS-i segment to max. 200 m with an extension plug (without an additional power supply unit) • Expansion of one bus segment with an AS-i repeater • Maximum size increases (when combined) to max. 600 m Your advantage: Lower infrastructure costs, more possibilities of use and greater freedom for plant planning	**3RK1, 6GK1**	Repeater/extender: See Catalog IK PI "Industrial Communication for Automation and Drives" Extension plug: 2/56
Extension plug			
Addressing units	**Addressing units** • Addressing all stations of the AS-Interface network (standard and A/B slaves) • Reading out the I/O and ID codes of the slaves • Parameterization of the slaves (ID1 or analog parameters) • Measurement of AS-Interface voltage • Enables direct setting of outputs and reading in of a slave's inputs • Storage of complete system configurations Your advantage: Easiest way to address and parameterize the slaves	**3RK1**	2/57
Analyzers	**AS-Interface analyzers** • Diagnostics units for completely checking the quality and function of an AS-Interface installation • Transmission of collected data through an RS 232 interface to a PC, evaluation by software • Easy and user-friendly operation • Automatically generated test logs • Advanced trigger functions enable exact analysis • Process data can be monitored online • In addition to digital I/O data it is also possible to view analog values and safety slaves in data mode Your advantage: Preventative testing of an AS-Interface network is possible, recorded logs facilitate remote diagnostics	**3RK1**	2/58
M12 sealing cap Cable terminating piece	**Miscellaneous accessories** Individual components such as sealing caps, cable adapters, distributors etc.	**3RG7, 3RG9, 3RK1, 3RX9, 6ES7**	2/61

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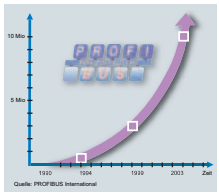
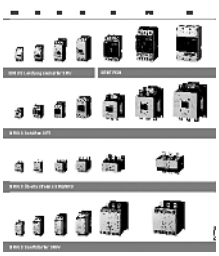
Introduction

		Order No.	Page
ECOFAST System			
	• Modular construction • Flexible expansion • Graded range of motor starters and frequency converters • Diagnostics capability • Communication using standardized field bus systems • Standardized connection method • Energy supply and distribution to the field device		2/63
SIRIUS Safety Integrated			
	• Safe sensing • Safe instructing and reporting • Safe monitoring and evaluating • Starting and safe shutting down		2/66
PROFIBUS			
	• PROFIBUS is an efficient, open and robust bus system which guarantees smooth communication • The system is fully standardized, thus enabling standardized components from different manufacturers to be connected without problem • Configuring, commissioning and troubleshooting can be performed from any position; this means that the freely selectable communication relationships are very flexible, easy to implement and simple to change • Fast local assembly and commissioning using the FastConnect cabling system • Constant monitoring of the network components by means of a simple and effective signaling concept • High protection for your investment because existing systems can be expanded without repercussions • High availability thanks to ring redundance with OLM • Optimum connection of the actuator-sensor level by router to AS-Interface (DP/AS-Interface Link 20E)		2/70
SIRIUS Modular System			
	• Load feeders up to 250 kW / 400 V are easy to implement from standard devices • Modular design: Everything fits together and can be combined • Economical and flexible thanks to seven compact sizes • Optimum variance with uniform accessories • Space-saving design with small device width and butt-mounting type of construction up to 60 °C • Fast commissioning, short setting-up times and simple wiring • Connection to AS-Interface and PROFIBUS DP possible • Extremely long life, low maintenance and reliable • Global approvals and certifications such as IEC, UL, CSA, CCC, shipbuilding • Permanently secure mounting, screw- or snap-connection • Spring-loaded terminals: Quick and secure connection, vibration-proof and maintenance-free • Short delivery periods thanks to world-wide logistics network • Environment-friendly production and materials, recycling capability, low power loss • Clear-cut, ergonomic design (winner of the iF Product Design Award)		2/80

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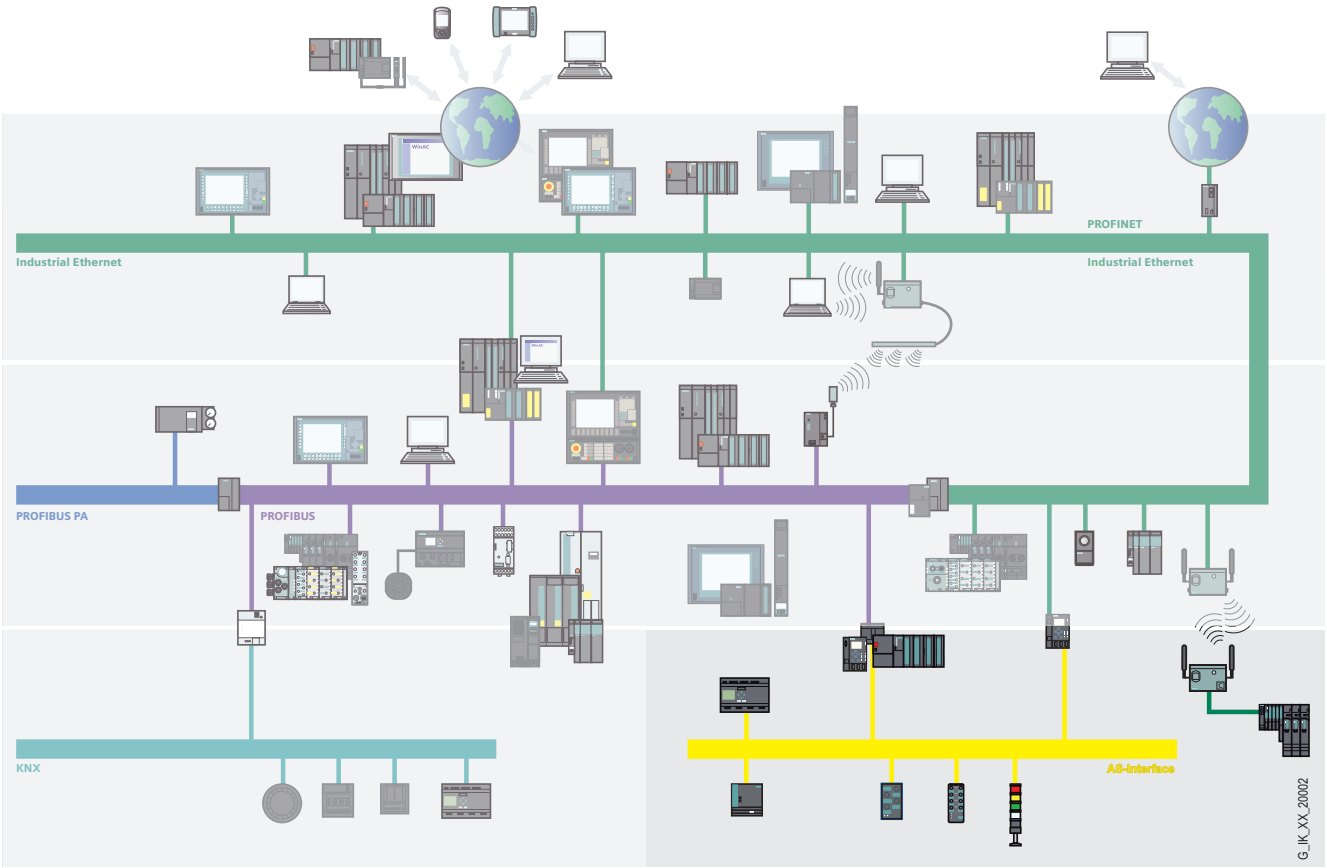
Overview

AS-Interface is an open, international standard according to EN 50295 and IEC 62026-2 for process and field communication. Leading manufacturers of actuators and sensors all over the world support the AS-Interface. Interested companies are provided with the electrical and mechanical specifications by the AS-Interface Association.

AS-Interface is a single master system. For automation systems from Siemens there are communications processors (CPs) and routers (links) which control the process or field communication as masters, and actuators and sensors which are activated as AS-Interface slaves.



Benefits

get Designed for Industry

A key feature of AS-Interface technology is the use of a shared two-wire cable for data transmission and the distribution of auxiliary power to the sensors/actuators. An AS-Interface power supply unit that meets the requirements of the AS-Interface transmission method is used for the distribution of auxiliary power. The AS-Interface cable used for the wiring is mechanically coded and hence protected against polarity reversal and can be easily contacted by the insulation piercing method.

Elaborately wired control cables in the control cabinet and marshalling racks can be replaced by AS-Interface.

The AS-Interface cable can be connected to any points thanks to a specially developed cable and connection by the insulation piercing method.

With this concept you become extremely flexible and achieve high savings.

Application

Operating modes

Generally, master interfaces have the following operating modes:

I/O data exchange

In this operating mode the inputs and outputs of the binary AS-Interface slaves are read and written.

Analog value transfer

AS-Interface masters according to the AS-Interface Specification V2.1 or V3.0 support integrated analog value processing. This means that data exchange with analog AS-Interface slaves (according to Analog Profile 7.3 or 7.4) is just as easy as with digital slaves.

Command interface

In addition to I/O data exchange with binary and analog AS-Interface slaves the AS-Interface masters provide a number of other functions through the command interface.

Hence it is possible, for example, for slave addresses to be issued, parameter values transferred or diagnostics information read out from user programs.

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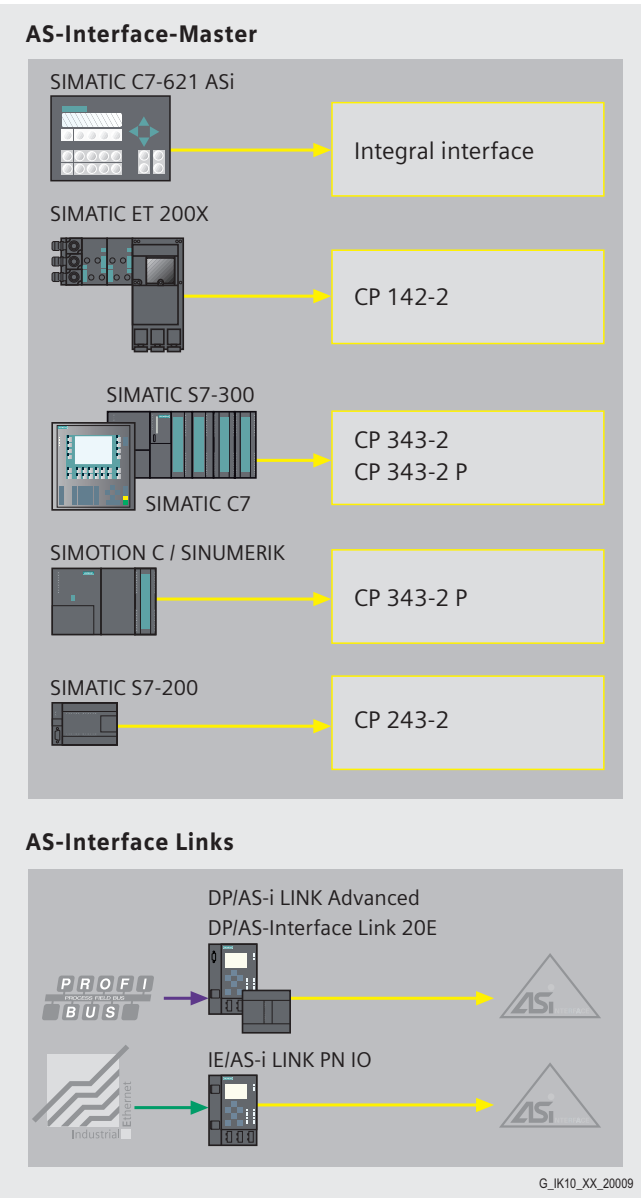
Communication overview

Overview

System components

Numerous system components are offered for implementing the communication. The key elements of a system installation are:

- Master interface modules for central control units such as SIMATIC S5 and SIMATIC S7, ET 200 M/X distributed peripherals
- AS-Interface shaped cables
- Network components such as repeaters/extenders
- Power supplies for slaves, modules for connection of standard sensors/actuators
- Actuators and sensors with integrated slave ASIC
- Safety modules for transmitting safe data through AS-Interface
- Address programming units for setting the slave address



AS-Interface masters and AS-Interface links (see Routers)

More information

For the SIMATIC NET products referred to above (order numbers 6GK..., 6XV1...) please also note the conditions of application, which can be consulted on the Internet site quoted below.

You can find more information on the Internet at:

http://www.siemens.com/simatic-net/ik-info

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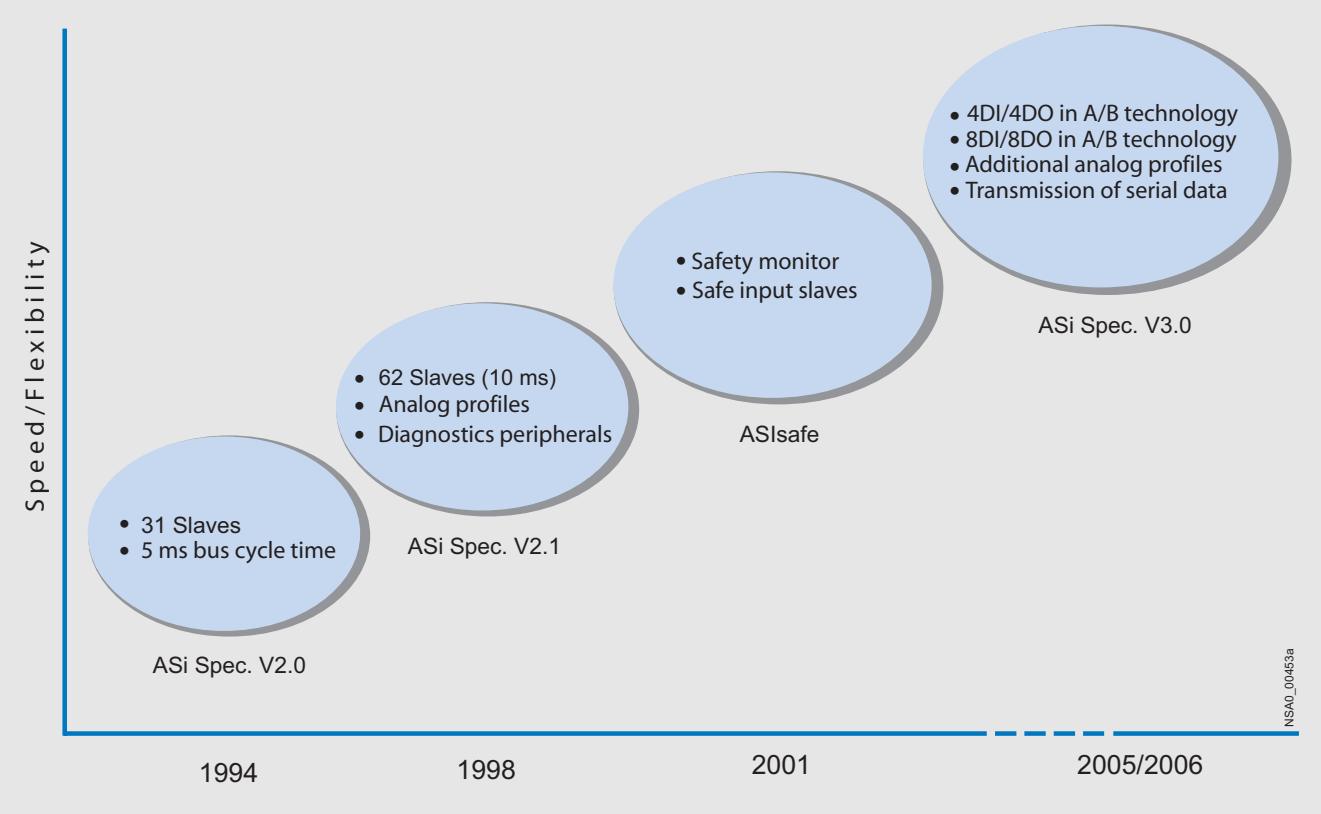
Overview



Technology development of the AS-Interface

System limitations of AS-Interface specification

AS-Interface Specification	Maximum number of slaves			Number of digital inputs	Number of digital outputs
	Digital	Analog	ASIsafe		
Version 2.0	31	31	31	31 × 4 = 124	31 × 4 = 124
Version 2.1	62	31	31	62 × 4 = 248	62 × 3 = 186
Version 3.0	62	62	31	62 × 8 = 496	62 × 8 = 496

Expansions of AS-Interface Specification 2.1

- AS-Interface Specification 2.1 enables the number of network stations to be doubled from 31 to 62. Using the so-called expanded addressing system, the 31 addresses available in an AS-Interface network can be split into two.
- If this option is used for each of the 31 slaves, the maximum number of stations in an AS-Interface network is then 62. The so-called A/B slaves can have a maximum of four inputs and three outputs. Expanded addressing is only possible for digital slaves, not for analog slaves and safety-oriented slaves (ASIsafe).
- Another function of the AS-Interface Specification V2.1 is the integrated analog value transfer function. In this case "integrated" means that no special function blocks are required for accessing the analog values. It is just as easy to access the analog values as the digital values. The integrated analog value transfer function can be used with analog slaves which support the profiles 7.3 and 7.4.

Expansions of AS-Interface specification 3.0

- The AS-Interface Specification 3.0 enables the connection of up to 1000 digital inputs and outputs (profile S-7.A.A: 8DI/8DO as A/B slave).
- New profiles have also enabled the option of expanded addressing for analog slaves.
- Acceleration of analog value transfer through "Fast Analog Profile".
- Variable use of analog modules: optional parameterization of the resolution (12/14 bit) and one or two channels.
- Asynchronous serial protocol 100 baud or 50 baud, bidirectional.

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AS-Interface specification

AS-Interface master

To be able to operate A/B slaves on an AS-Interface network you must also use master modules that meet the minimum requirements of Specification 2.1.

A/B technology is supported by the masters of the SIMATIC S7 and the DP/AS-Interface links from Siemens. Only standard slaves and A slaves (= A/B slave with an A address) can be operated on masters which do not support Specification 2.1.

The subaddress of A/B slaves is set to "A" in the as-delivered state.

The new masters that comply with Specification 3.0 support all new slave profiles, but are also fully backwards compatible.

AS-Interface Specification	Available masters
Version 2.1	S7-200 (CP 243-2), S7-300 (CP 343-2, 343-2 P), DP/ASi Link 20E
Version 3.0	DP/AS-i Link Advanced

The AS-Interface specification relevant for the respective slave can be found in the section *Selection and ordering data*.

The exact slave profile is shown in the section *Technical Specifications*.

Communication cycle

AS-Interface Specification	Maximum cycle time	Slave profile
Version 2.0	5 ms	S-X.0, S-X.1, S-X.F
Version 2.1	5 ms with 31 slaves 10 ms with 62 slaves	S-X.A, S-7.3, S-7.4, S-7.F
Version 3.0	as for Version 2.1, and profile-specific 10 ms for inputs/outputs (e.g. 20 ms for 4DI/4DO and 40 ms for 8DI/8DO)	S-7.5.5; S-7.A.5, S-B.A.5; S-7.A.7, S-7.A.8; S-7.A.9, S-7.A.A, S-6.0

Standard slaves are queried in each cycle (max. cycle time: 5 ms). If only one A or B slave is installed at an address, this slave will be queried in each cycle (max. cycle time: 5 ms). If an A/B slave pair is installed at an address, the A slave will be queried in one cycle and the B slave in the next cycle (max. cycle time: 10 ms). If only standard and/or A slaves are installed in a network, the cycle time is identical to the standard masters (max. cycle time: 5 ms).

Whether an AS-Interface slave is a standard slave or an A/B slave is noted in the section *Selection and Ordering Data* in the column *Slave Type* and can be deduced from the section *Technical Specifications* of the slave in question in the Technical Information LV 1 T.

All slave types can be combined within a single AS-Interface network.

Benefits

- Reduction of master and power supply costs thanks to a higher number of slaves and I/Os per AS-Interface line.
- Improved decentralization in plants with numerous, widely spread signals.
- Further expansion of existing AS-Interface systems is possible.

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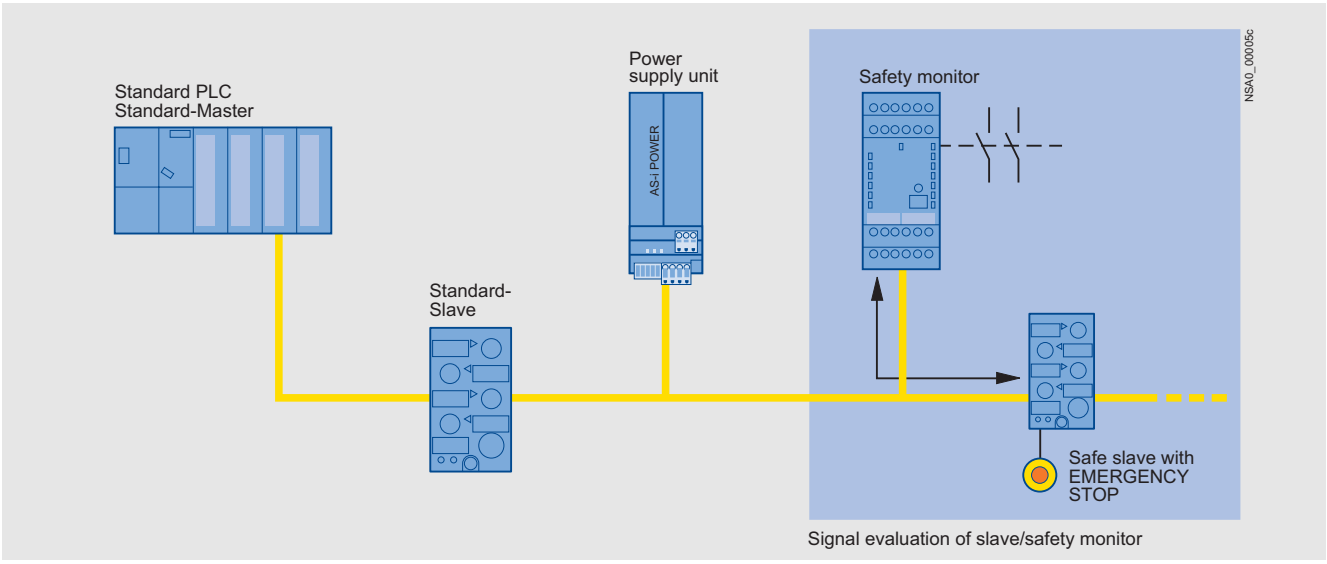
Overview



Signal evaluation of slave/safety monitor

Master information (through regular I/O transfer)

Safety is included

The ASIsafe concept supports the direct integration of safety-related components, such as emergency stop switches, protective door switches or safety light arrays, in the AS-Interface network. These are fully compatible with the familiar AS-Interface components (masters, slaves, power supplies, repeaters, etc.) according to IEC 62062/EN 50295 and are operated in conjunction with them on the yellow AS-Interface cable.

The signals of the safety sensors are evaluated by a safety monitor which not only monitors the switching signals of the safety sensors but also continuously checks that the data transmission works correctly. The safety monitor has one or two enabling circuits which are configured with two channels and are used to switch the machine or plant to the safe state. Sensors and monitors can be connected to any points of the AS-Interface network. Also, several monitors can be used on one network.

A failsafe controller or a special master is not required. The master regards safety slaves like all other slaves and receives the safety data solely for information purposes. Hence it is also possible to expand all existing AS-Interface networks.

ASIsafe ensures a maximum response time of 40 ms. This is the time between the signal being applied to the input of the safe slave and the output on the safety monitor being switched off.

Tested safety

The system was tested and approved by TÜV (Germany), NRTL (USA) and INRS (France). The transmission method for safety-oriented signals is designed so that applications up to Category 4 according to EN 954-1 and SIL 3 according to IEC 61508 can be realized.

Software

The safety-oriented applications can be compiled and transferred into the monitor using the configuration software. The software also enables online diagnostics.

Benefits

- No failsafe PLC or special master is required
- Simple system structure thanks to standardized AS-Interface technique
- Safety-related and standard data on the same bus
- Existing systems can be expanded quickly and easily
- Optimum integration in TIA (Safety Diagnostics) and Safety Integrated
- Safe signals can be combined in groups
- Inclusion of the safety signals in the plant diagnostics, also on existing HMI panels
- Approved up to Category 4 according to EN 954-1 or SIL 3 according to IEC 61508
- ASIsafe is certified by TÜV (Germany), NRTL (USA) and INRS (France)

Application

Integrated safety technology in the AS-Interface system is used wherever EMERGENCY-STOP pushbuttons, protective door interlocks, stop Category 0 and 1, two-hand operator controls and light arrays are now installed.

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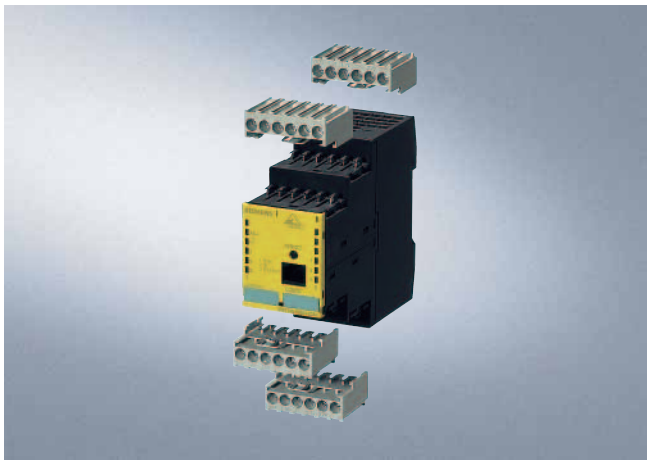
AS-Interface safety monitors

Overview



The safety monitor is the centerpiece of ASIsafe. A safe application is configured using a PC and the safety monitor. Various application-specific operating modes can be selected for this. They include, for example, an EMERGENCY-STOP function, tumbler and selection of stop Category 0 or Category 1.

To be able to make full use of the AS-Interface diagnostics options, the monitor can also be operated with an AS-Interface address if required. With the help of the diagnostics block for STEP7, which is included on the ASIsafe CD, the full diagnostics spectrum can be processed further in the higher-level PLC.

The monitor comes in two expansion levels:

- **Basic safety monitor** with starter set of modules and basic functionality
- **Expanded safety monitor** with expanded features and functionality

Both expansion levels are available with one or two enabling circuits with two-channel configuration.

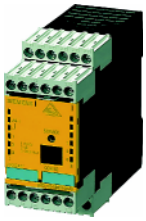
The safety monitor is used in an AS-Interface bus system to monitor protective devices, e.g. EMERGENCY-STOP switches. It is classified in Safety Category 4 according to EN 954-1.

According to IEC 61508 the safety monitor can be used in loops up to SIL3. The user must calculate the PFD value of the total loop.

ON period in months	Total operating time in years	PFD
3	10	$\leq 4 \times 10^{-5}$
6	10	$\leq 6 \times 10^{-5}$
9	10	$\leq 9 \times 10^{-5}$

Note: Depending on the choice of safety components used, the complete safety system may also be classified in a lower safety category.

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 105-1BE04-0CA0	**Basic safety monitors**							
	• One enabling circuit	►	**3RK1 105-1AE04-0CA0**		1	1 unit	121	0.336
	• Two enabling circuits	►	**3RK1 105-1BE04-0CA0**		1	1 unit	121	0.408
	Expanded safety monitors							
	• One enabling circuit	A	**3RK1105-1AE04-2CA0**		1	1 unit	121	0.336
	• Two enabling circuits	A	**3RK1105-1BE04-2CA0**		1	1 unit	121	0.408
	ASIsafe CD • Configurations software asimon V2 • Diagnostics package for STEP7 (FB102)	►	**3RK1 802-2FB06-0GA0**		1	1 unit	121	0.212
3RK1 901-5AA00	**Cable sets** • PC configuration cable • Transfer cable	►	**3RK1 901-5AA00**		1	1 unit	121	0.054
	Sealable covers	►	**3RP1 902**		1	5 units	101	0.004

* You can order this quantity or a multiple thereof.

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Overview

Safety modules for AS-Interface (ASIsafe modules) are available for field use in degree of protection IP67 (K20F, K45F and K60F compact modules) and for the control cabinet (S22.5F SlimLine modules) in degree of protection IP20:

K45F compact safety modules for operation in the field

The K45F compact safety module is equipped with two "safe" inputs. For applications up to Category 2 according to EN 954-1 the two inputs can be assigned separately. If category 4 is required, a two-channel input is available on the module.

K60F compact safety modules for operation in the field

The K60F compact safety module similarly has two standard outputs in addition to two safety inputs (see K45F for categories); power is supplied from either the yellow AS-Interface cable or as auxiliary voltage from the black 24 V DC cable.

K20F compact safety modules for operation in the field

Being only 20 mm wide, the K20F module is particularly well suited for applications where modules need to be arranged in the most confined space. The K20F modules are connected to the AS-Interface with a round cable with M12 cable box instead of with the AS-Interface flat cable. This enables extremely compact installation. The flexibility of the round cable means that it can also be used on moving machine parts without any problems. The K20 modules are also ideal for such applications as their non-encapsulated design makes them particularly light in weight.

S22.5F SlimLine safety modules for operation in control cabinets and local control cabinets

The S22.5F SlimLine safety module has two safety inputs. The safe connection of signals to ASIsafe networks in the cabinet is also possible therefore. For operation up to Category 2, both inputs can be separately assigned; if Category 4 is required, a two-channel input is available on the module.

New in the range are two S22.5F module versions which have two standard outputs in addition to the two safety inputs; power is supplied either from only the yellow AS-Interface cable or as auxiliary voltage from the black 24 V DC cable.

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AS-Interface safety modules

2

Selection and ordering data

	Version		DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 205-0BQ30-0AA3	**K20F compact safety modules**								
	I/O type	U_{aux} 24 V							
	2 F-DI	--	A	**3RK1 205-0BQ30-0AA3**		1	1 unit	121	0.075
3RK1 205-0BQ00-0AA3	**K45F compact safety modules**[1]								
	I/O type	U_{aux} 24 V							
	2 F-DI	--	▶	**3RK1 205-0BQ00-0AA3**		1	1 unit	121	0.103
3RK1 901-2EA00	**K45 mounting plates**								
	• For wall mounting		▶	**3RK1 901-2EA00**		1	1 unit	121	0.027
	• For standard rail mounting		▶	**3RK1 901-2DA00**		1	1 unit	121	0.036
3RK1 405-1BQ00-0AA3	**K60F compact safety modules**[1]								
	I/O type	U_{aux} 24 V							
	2 F-DI / 2 DO	--	▶	**3RK1 405-0BQ00-0AA3**		1	1 unit	121	0.207
	2 F-DI / 2 DO	✓	▶	**3RK1 405-1BQ00-0AA3**		1	1 unit	121	0.208
3RK1 205-0BE00-0AA2	**S22.5F SlimLine Safety modules**								
	Connection	I/O type	U_{aux} 24 V						
	Screw	2 F-DI	--	A	**3RK1 205-0BE00-0AA2**	1	1 unit	121	0.132
	Screw	2 F-DI / 2 DO	--	▶	**3RK1 405-0BE00-0AA2**	1	1 unit	121	0.180
	Screw	2 F-DI / 2 DO	✓	▶	**3RK1 405-1BE00-0AA2**	1	1 unit	121	0.180
	Spring-loaded	2 F-DI	--	B	**3RK1 205-0BG00-0AA2**	1	1 unit	121	0.102
	Spring-loaded	2 F-DI / 2 DO	--	B	**3RK1 405-0BG00-0AA2**	1	1 unit	121	0.170
	Spring-loaded	2 F-DI / 2 DO	✓	B	**3RK1 405-1BG00-0AA2**	1	1 unit	121	0.170
3RK1 901-0CA00	**K60 mounting plates**								
	• For wall mounting		▶	**3RK1 901-0CA00**		1	1 unit	121	0.065
	• For standard rail mounting		▶	**3RK1 901-0CB01**		1	1 unit	121	0.095
3RK1 901-1AA00	**Input bridges for K45/K60F**								
	• Black version		A	**3RK1 901-1AA00**		1	1 unit	121	0.012
	• Red version		D	**3RK1 901-1AA01**		1	1 unit	121	0.013
3RK1 901-1KA01	**AS-Interface sealing caps M12, tamper-proof** for free M12 sockets		A	**3RK1 901-1KA01**		100	10 units	121	0.100

[1] Modules are supplied without mounting plate.

* You can order this quantity or a multiple thereof.

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Overview

- Master connection for the ET 200X distributed peripherals system to AS-Interface using 12-pole connector
- Easy operation in the input/output address range of the SIMATIC ET 200X
- No configuration of the CP for AS-Interface required
- Actuating up to 31 AS-Interface slaves according to AS-Interface Specification V2.0
- Monitoring of the supply voltage on the AS-Interface shaped cable
- Distinct increase in the number of inputs/outputs of the ET 200X

Benefits

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- Enables PLC functionality in degree of protection IP65 when used in conjunction with BM 147 of ET 200X
- Can also be used without an additional enclosure in harsh industrial conditions thanks to the high degree of protection IP67
- More flexibility and versatility in the use of ET 200X as the result of the distinct increase in the number of inputs/outputs available
- Shorter start-up times through simple configuration at the press of a button
- Reduction of standstill and servicing times in the event of a fault thanks to the LED indicators:
  - Status of the AS-Interface network
  - Slaves connected and their readiness for operation
  - Monitoring of the AS-Interface mains voltage

Application

The CP 142-2 enables connection of the ET 200X distributed peripherals system to AS-Interface.

The module enables the actuation of up to 31 AS-Interface slaves and, when using bidirectional slaves, up to 248 binary elements.

Up to six CP 142-2 communications processors can be operated on the ET 200X.

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
CP 142-2 communications processors for connection of SIMATIC ET 200X to AS-Interface; without front connectors	A	**6GK7 142-2AH00-0XA0**		1	1 unit	541	0.322
Manuals for CP 142-2							
• German	X	**6GK7 142-2AH00-8AA0**		1	1 unit	540	0.500
Electronic manuals Communications systems, protocols, products On CD-ROM German/English	B	**6GK1 975-1AA00-3AA0**		1	1 unit	540	0.017

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CP 243-2

Overview

The CP 243-2 is the AS-Interface master for the innovative SIMATIC S7-200 generation. This communications processor (6GK1 243-2AX01-0AX0) supports the extended AS-Interface Specification V2.1 and performs the following functions:

- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to the extended AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to the extended AS-Interface Specification V2.1
- Status displays of operating states and indication of the functional readiness of connected slaves by means of LEDs in the front panel
- Fault indications (e.g. AS-Interface voltage fault, configuration fault) by means of LEDs in the front panel
- Compact enclosure in the design of the innovative SIMATIC S7-200 generation

Benefits

get Designed for Industry

- More flexibility and versatility in the use of SIMATIC S7-200 as the result of the distinct increase in the number of digital and analog inputs/outputs available
- Shorter start-up times through simple configuration at the press of a button
- Reduction of standstill and servicing times in the event of a fault thanks to the LED indicators
- Status of the CP
  - Indication of all the slaves connected and their readiness for operation
  - Monitoring of the AS-Interface mains voltage

Application

The CP 243-2 is the AS-Interface master connection solely for the 22x CPUs of the innovative SIMATIC S7-200 generation. Through connection to AS-Interface the number of inputs and outputs available for S7-200 is greatly increased (max. 248 DI / 186 DO on the AS-Interface per CP).

Furthermore, analog values (per CP a maximum of 31 analog slaves with up to 4 channels each) also become available on the AS-Interface for the S7-200 thanks to the integrated analog value processing.
On the S7-200, up to two CP 243-2 communication processors can be operated simultaneously.

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg
CP 243-2 communications processors for connection of SIMATIC S7-200 (2nd generation) to AS-Interface using a bus connector	A	**6GK7 243-2AX01-0XA0**		1	1 unit	541	0.204
Manuals for CP 243-2 including AS-Interface Basics and a floppy disk with sample programs Paper version							
• German	D	**6GK7 243-2AX00-8AA0**		1	1 unit	540	0.909
• English	D	**6GK7 243-2AX00-8BA0**		1	1 unit	540	0.891
• French	D	**6GK7 243-2AX00-8CA0**		1	1 unit	540	0.916
• Spanish	D	**6GK7 243-2AX00-8DA0**		1	1 unit	540	0.898
• Italian	D	**6GK7 243-2AX00-8EA0**		1	1 unit	540	0.895

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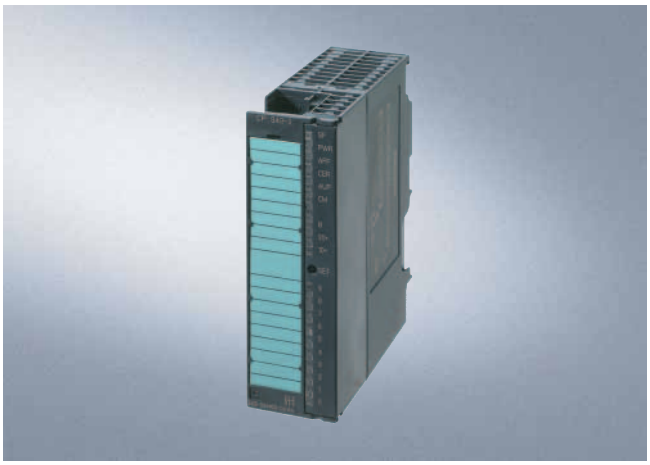
Overview



The CP 343-2 is the AS-Interface master for the SIMATIC S7-300 programmable controller and the ET 200M distributed I/O station. The communications processor performs the following functions:

- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to the extended AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to the extended AS-Interface Specification V2.1
- Status displays of operating states and indication of the functional readiness of connected slaves by means of LEDs in the front panel
- Fault indications (e.g. AS-Interface voltage fault, configuration fault) by means of LEDs in the front panel
- Compact enclosure in the design of the SIMATIC S7-300

Benefits

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- Shorter start-up times through simple configuration at the press of a button
- Construction of flexible distributed structures by use in the DP slave ET 200M
- Reduction of standstill and servicing times in the event of a fault thanks to the LED indicators:
  - Status of the AS-Interface network
  - Slaves connected and their readiness for operation
  - Monitoring of the AS-Interface mains voltage
- Lower costs for stock keeping and spare parts because the CP can be used for the SIMATIC S7-300 as well as for the ET 200M
- Well suited also for complex applications thanks to connection options for 62 slaves and integral analog value processing

Application

The CP 343-2 is the AS-Interface master connection for the SIMATIC S7-300 and the ET 200M. Through connection to AS-Interface it is possible to access max. 248 DI/186 DO per CP.

With the integrated analog value processing it is also possible to evaluate very simple analog signals (per CP on max. 31 analog slaves with four channels each).

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
CP 343-2 communications processors for connection of SIMATIC S7-300 and ET 200M to AS-Interface, without front connectors	A	**6GK7 343-2AH00-0XA0**		1	1 unit	541	0.265
Front connectors 20-pole, with screw-type contacts	►	**6ES7 392-1AJ00-0AA0**		1	1 unit	230	0.069
Manuals CP 343-2 and CP 343-2 P including software (FC) and examples Paper version							
• German	X	**6GK7 343-2AH00-8AA0**		1	1 unit	540	0.839
• English	X	**6GK7 343-2AH00-8BA0**		1	1 unit	540	0.832
• French	X	**6GK7 343-2AH00-8CA0**		1	1 unit	540	0.813
• Spanish	X	**6GK7 343-2AH00-8DA0**		1	1 unit	540	0.827
• Italian	X	**6GK7 343-2AH00-8EA0**		1	1 unit	540	0.830
Electronic manuals Communications systems, protocols, products On CD-ROM German/English	B	**6GK1 975-1AA00-3AA0**		1	1 unit	540	0.017

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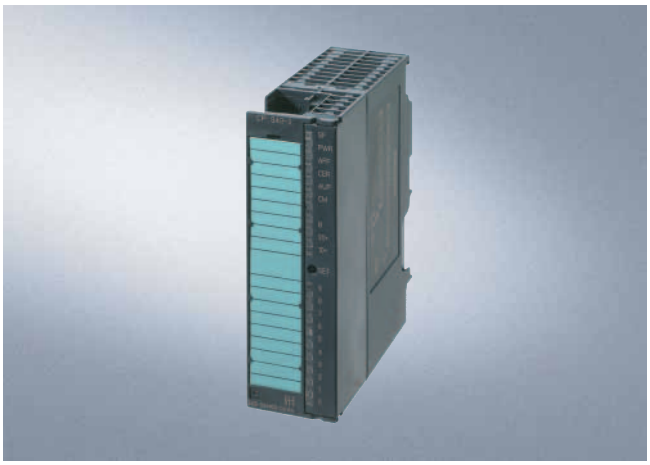
CP 343-2 P

Overview



The CP 343-2 P is the AS-Interface master for the SIMATIC S7-300 programmable controller and the ET 200M distributed I/O station. The communications processor performs the following functions:

- **Supports the configuration of the AS-Interface network with STEP 7 V5.2 and higher**
- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to the extended AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to the extended AS-Interface Specification V2.1
- Fault indications (e.g. AS-Interface voltage fault, configuration fault) by means of LEDs in the front panel
- Compact enclosure in the design of the SIMATIC S7-300

Benefits

get Designed for Industry

- Improved plant documentation and support for service assignments thanks to documentation of the AS-Interface configuration in the STEP 7 project
- Provides diagnostics of the AS-Interface networks
- Shorter start-up times through simple configuration at the press of a button
- Construction of flexible distributed structures by use in the DP slave ET 200M

- Reduction of standstill and servicing times in the event of a fault thanks to the LED indicators:
  - Status of the AS-Interface network
  - Slaves connected and their readiness for operation
  - Monitoring of the AS-Interface mains voltage
- Lower costs for stock keeping and spare parts because the CP can be used for the SIMATIC S7-300 as well as for the ET 200M
- Well suited also for complex applications thanks to connection options for 62 slaves and integral analog value processing

Application

The CP 343-2 P is the AS-Interface master connection for the SIMATIC S7-300 and the ET 200M. Through connection to AS-Interface it is possible to access max. 248 DI/186 DO per CP.

With the integrated analog value processing it is also possible to evaluate very simple analog signals (per CP on max. 31 analog slaves with four channels each).

CP 342-2 functionality was adopted unchanged for the CP 343-2 P. An old S7 user program can thus be used without restrictions with the new CP. In addition it is possible to download or upload the AS-Interface configuration with STEP 7 hardware configuration.

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
CP 343-2 P communications processors for connection of SIMATIC S7-300 and ET 200M to AS-Interface, without front connectors	A	**6GK7 343-2AH10-0XA0**		1	1 unit	541	0.262
Front connectors 20-pole, with screw-type contacts	►	**6ES7 392-1AJ00-0AA0**		1	1 unit	230	0.069
Manuals CP 343-2 and CP 343-2 P including software (FC) and examples Paper version							
• German	X	**6GK7 343-2AH00-8AA0**		1	1 unit	540	0.839
• English	X	**6GK7 343-2AH00-8BA0**		1	1 unit	540	0.832
• French	X	**6GK7 343-2AH00-8CA0**		1	1 unit	540	0.813
• Spanish	X	**6GK7 343-2AH00-8DA0**		1	1 unit	540	0.827
• Italian	X	**6GK7 343-2AH00-8EA0**		1	1 unit	540	0.830
Electronic manuals Communications systems, protocols, products On CD-ROM German/English	B	**6GK1 975-1AA00-3AA0**		1	1 unit	540	0.017

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Overview

PN	DP-M	DP-S	ASi-M
■			■

IO-C	IO-D	CBA
	□	

- Compact router between Industrial Ethernet (PROFINET IO-Device) and AS-Interface
- Single and double AS-Interface master (according to AS-Interface Specification V3.0) for connection of 62 AS-Interface slaves
- Performant, integrated analog value transfer
- Integrated ground-fault monitoring for the AS-Interface cable
- User-friendly local diagnostics and start-up by means of a full graphic display and control keys or through a web interface with a standard browser
- Optimum TIA integration through STEP 7, integration in non-Siemens engineering tools using PROFINET type file (GSD)
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply from the AS-Interface shaped cable or alternatively with 24 V DC (optional)
- Module exchange without a PG using C-PLUG (optional)

Benefits

get Designed for Industry

- Short start-up times through simple configuration at the press of a button and testing of the AS-Interface line using the display or web interface
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display or web interface
- Reduction of installation costs because the power supply comes completely from the AS-Interface cable, making an additional power supply superfluous
- Reduced amount of engineering work thanks to user-friendly configuration of Siemens slaves by Drag&Drop in HW Config (STEP 7)

Application

The DP/AS-i LINK PN IO is a PROFINET IO device (according to EN 61158) and an AS-Interface master (based on AS-Interface Specification V3.0 according to EN 50295). It enables transparent data access to AS-Interface from Industrial Ethernet.

PROFINET IO controllers can exchange I/O data with AS-Interface in cyclic mode. AS-i master calls (parameters, diagnostics) can be performed in addition with acyclic services. As such, the IE/AS-i LINK PN IO is particularly well suited for a decentral construction and for connection of a lower-level AS-Interface network.

For applications with typical volumes of project data it is sufficient to use the IE/AS-i LINK PN IO in its version as an AS-i single master.

For applications with large volumes of project data the IE/AS-i LINK PN IO in its version as an AS-i double master is used. In this case, twice the volume of project data can be used on two AS-i lines running independently of each other.

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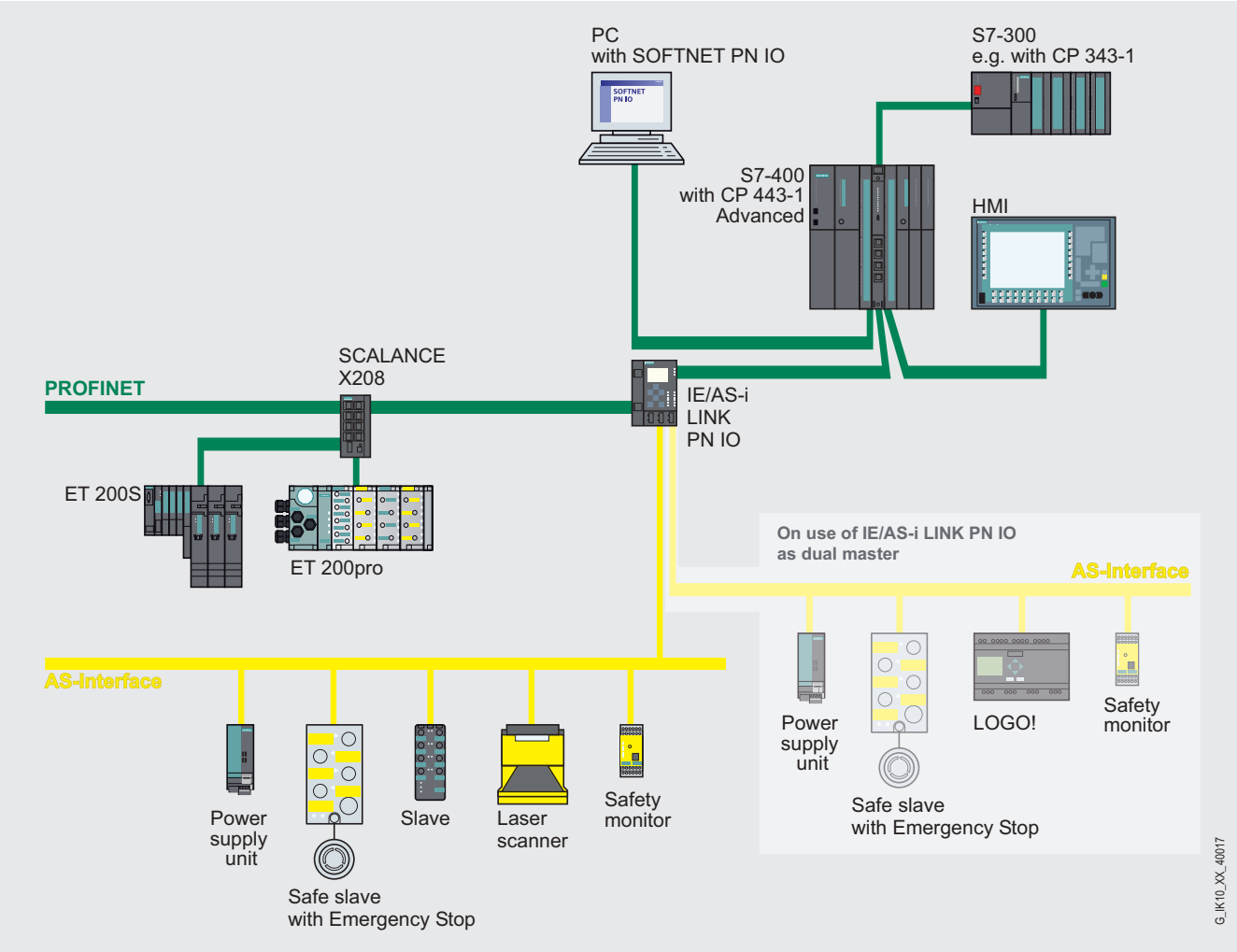
IE/AS-i LINK PN IO



Integration of AS-Interface on PROFIBUS through IE/AS-i LINK PN IO as single/double master

Using an upstream IWLAN client module, e.g. SCALANCE W746-1PRO, an AS-Interface line can be integrated in the PROFINET world by wireless means. Sample uses are applications which up to now have been performed with fault-prone tow chain or collector wire technology; maintenance costs are thus reduced.

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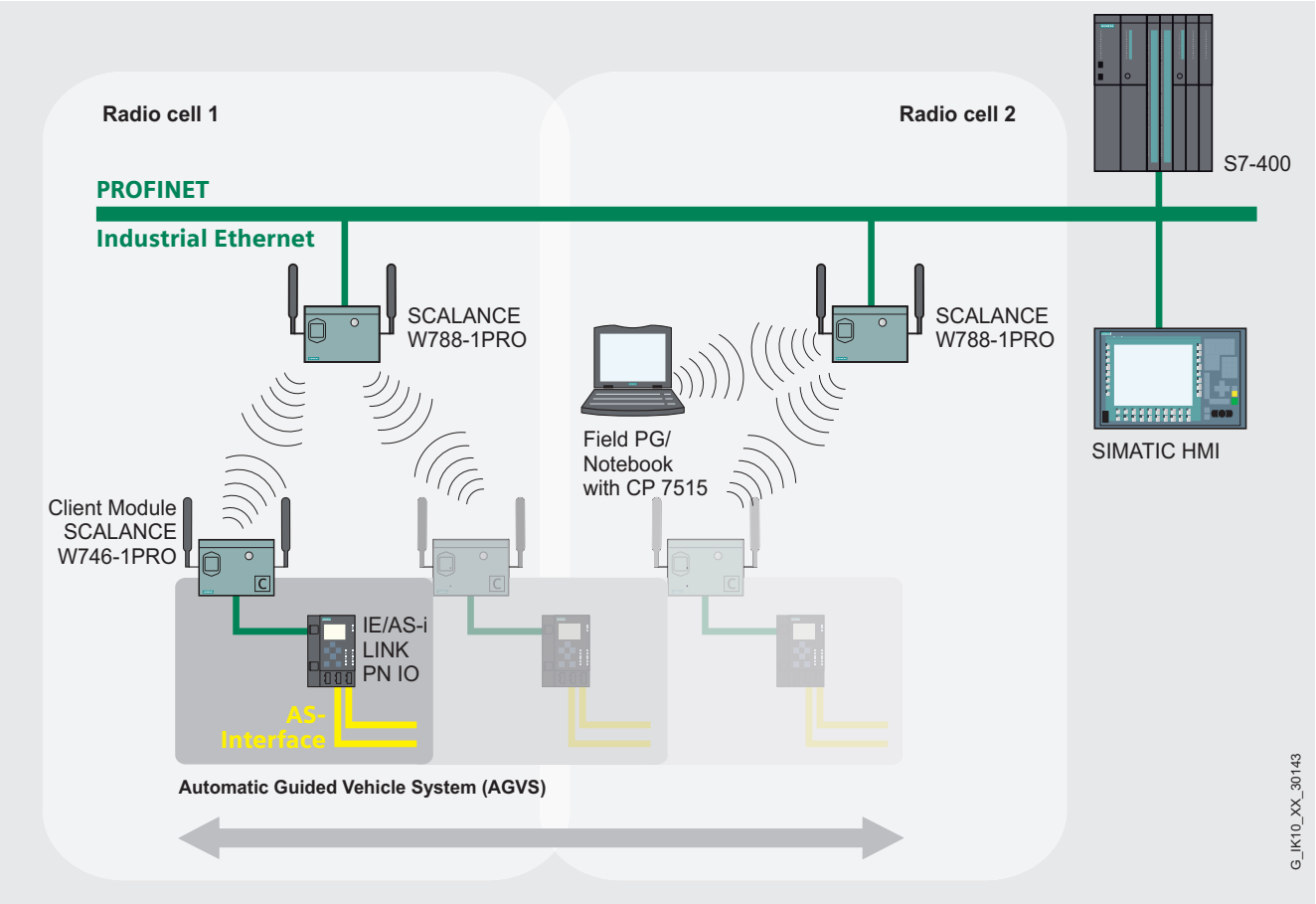

Wireless communication between Industrial Ethernet and AS-Interface components

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	IE/AS-i LINK PN IO							
	Router between Industrial Ethernet and AS-Interface; M3 and M4 master profiles, extended AS-Interface Specification V3.0; degree of protection IP20; manual on CD-ROM, German, English, French, Spanish, Italian							
	• Single master with display	▶	**6GK1 411-2AB10**		1	1 unit	543	0.380
	• Double master with display	▶	**6GK1 411-2AB20**		1	1 unit	543	0.380
Accessories								
	C-PLUG	A	**6GK1 900-0AB00**		1	1 unit	543	0.200
	Exchange medium for the simple exchange of devices in the event of a fault; for accommodating configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot							
	IE FC RJ45 Plug 90							
	RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated cutting and clamping contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder, e.g. for ET 200S							
	• 1 pack = 1 unit	A	**6GK1 901-1BB20-2AA0**		1	1 unit	543	0.030
	• 1 pack = 10 units	A	**6GK1 901-1BB20-2AB0**		1	1 unit	543	0.300
	• 1 pack = 50 units	A	**6GK1 901-1BB20-2AE0**		1	1 unit	543	1.500

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DP/AS-i LINK Advanced

Overview

PN	DP-M	DP-S	ASi-M
		■	■

- Compact router between PROFIBUS (DP Slave) and AS-Interface
- Single and double AS-Interface master (according to AS-Interface Specification V3.0) for connection of 62 AS-Interface slaves
- Performant, integrated analog value transfer
- Integrated ground-fault monitoring for the AS-Interface cable
- User-friendly local diagnostics and start-up by means of a full graphic display and control keys or through a web interface with a standard browser
- Optimum TIA integration through STEP 7, integration in non-Siemens engineering tools using PROFIBUS type file (GSD)
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply from the AS-Interface shaped cable or alternatively with 24 V DC (optional)
- Module exchange without a PG using C-PLUG (optional)

Benefits

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- Short start-up times through simple configuration at the press of a button and testing of the AS-Interface line using the display or web interface
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display or web interface and through simple module exchange with the help of the C-PLUG exchange medium
- Reduction of installation costs because the power supply comes completely from the AS-Interface cable, making an additional power supply superfluous
- Reduced amount of engineering work thanks to user-friendly configuration of Siemens slaves using the slave catalog in HW-Config (STEP 7)
- Costs saved by the double AS-Interface master when large volumes of project data are involved

Application

The DP/AS-i LINK Advanced is a PROFIBUS DPV1 slave (according to EN 50170) and an AS-Interface master (based on AS-Interface Specification V3.0 according to EN 50295). It enables transparent data access to AS-Interface from PROFIBUS DP.

PROFIBUS DP masters can exchange I/O data with AS-Interface in cyclic mode; DP masters with acyclic services can perform AS-Interface master calls in addition. As such, the DP/AS-i LINK Advanced is particularly well suited for a decentral construction and for connection of a lower-level AS-Interface network.

For applications with typical volumes of project data it is sufficient to use the DP/AS-i LINK Advanced in its version as an AS-Interface single master.

For applications with large volumes of project data the DP/AS-i LINK Advanced in its version as an AS-Interface double master is used. In this case, twice the volume of project data can be used on two AS-Interface lines running independently of each other.

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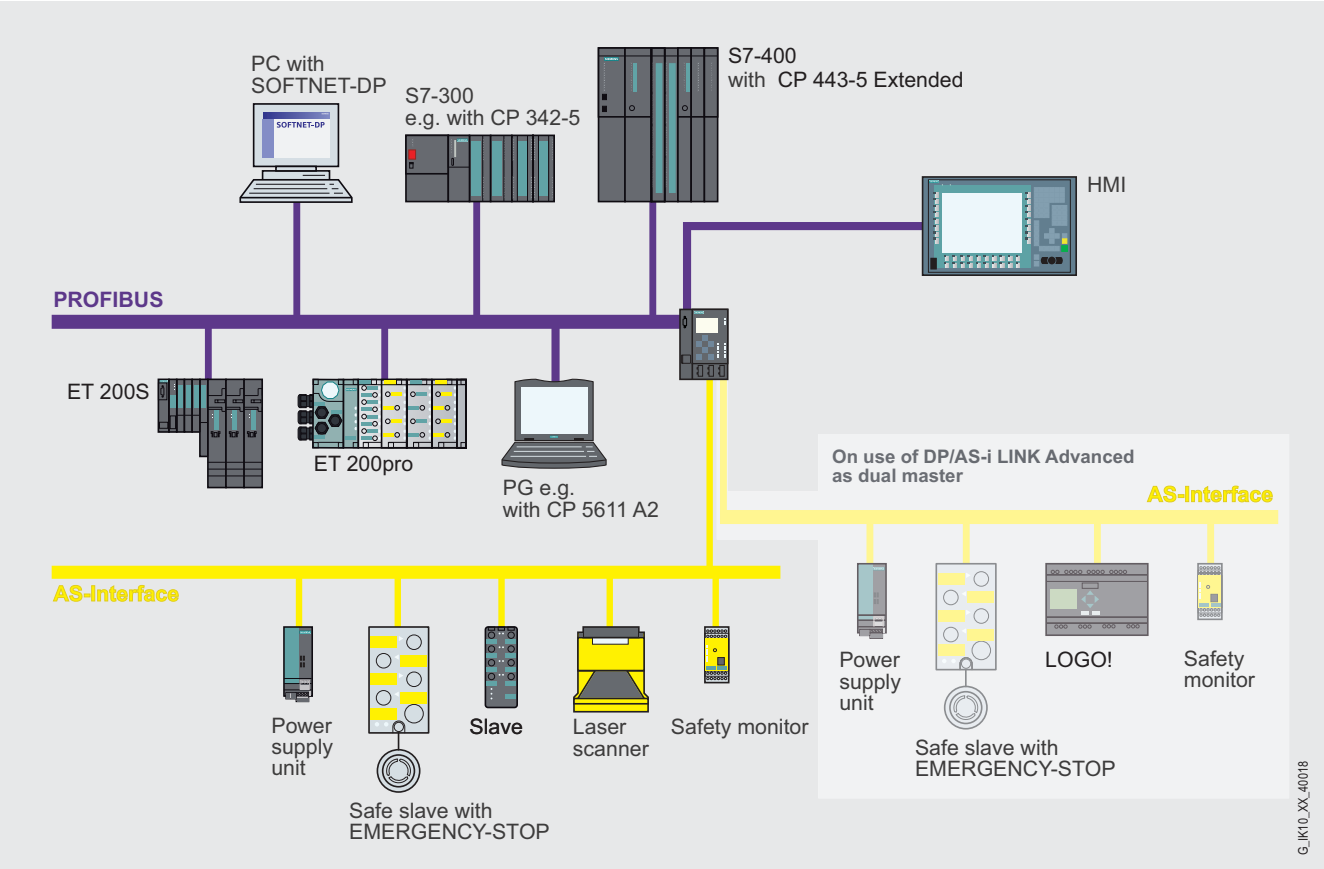

Integration of AS-Interface on PROFIBUS through DP/AS-i LINK Advanced as single/double master

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	DP/AS-i LINK Advanced Router between PROFIBUS DP and AS-Interface; M3 and M4 master profiles, extended AS-Interface Specification V3.0; degree of protection IP20; manual on CD-ROM, German, English, French, Spanish, Italian							
	• Single master with display	A	**6GK1 415-2BA10**		1	1 unit	543	0.380
	• Double master with display	A	**6GK1 415-2BA20**		1	1 unit	543	0.380
Accessories								
	C-PLUG Exchange medium for the simple exchange of devices in the event of a fault; for accommodating configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot	A	**6GK1 900-0AB00**		1	1 unit	543	0.200
	IE FC RJ45 Plug 90 RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated cutting and clamping contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder, e.g. for ET 200S							
	• 1 pack = 1 unit	A	**6GK1 901-1BB20-2AA0**		1	1 unit	543	0.030
	• 1 pack = 10 units	A	**6GK1 901-1BB20-2AB0**		1	1 unit	543	0.300
	• 1 pack = 50 units	A	**6GK1 901-1BB20-2AE0**		1	1 unit	543	1.500
	RS 485 bus connectors with angled cable feeder (35°) Screw terminals, max. transmission rate 12 Mbit/s							
	• Without PG interface	►	**6ES7 972-0BA60-0XA0**		1	1 unit	250	0.045

*** You can order this quantity or a multiple thereof.**

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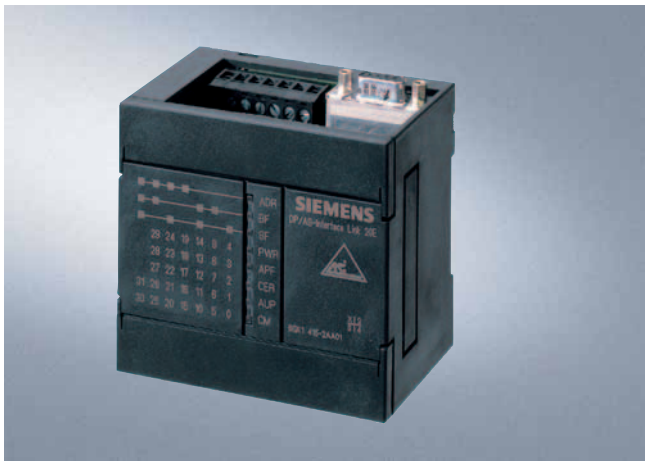
DP/AS-Interface Link 20E

Overview



PN	DP-M	DP-S	ASi-M
		■	■

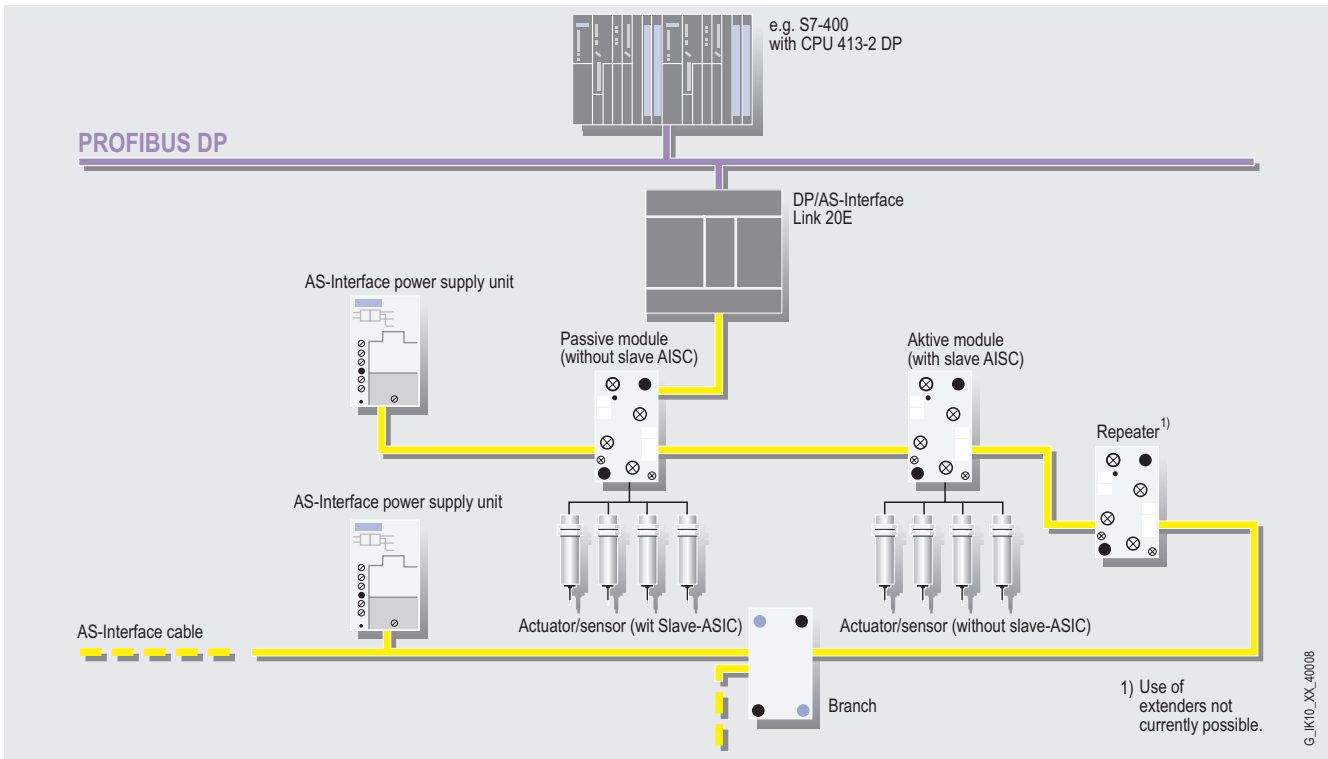
DP/AS-Interface Link 20E connects PROFIBUS DP to AS-Interface. It performs the following functions:

- PROFIBUS DP slave and AS-Interface master
- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to the extended AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to the extended AS-Interface Specification V2.1, i.e. master class M3
- Supply from AS-Interface cable; hence no additional power supply required
- Supports the uploading of the AS-Interface configuration in STEP 7 V5.2 and higher

Benefits

get Designed for Industry

- Reduction of installation costs because the power supply comes completely from the AS-Interface cable, making an additional power supply superfluous.
- Short start-up times through simple configuration at the press of a button
- Reduction of standstill and servicing times in the event of slave failure thanks to the LED indicators
- Easy and fast start-up through reading out the AS-Interface configuration (ES03 and higher)



Transition from PROFIBUS DP to AS-Interface using DP/AS-Interface Link 20E

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Application

The DP/AS-Interface Link 20E is a PROFIBUS DP slave (according to EN 50170) and an AS-Interface master (according to EN 50295). It enables the AS-Interface to be operated on PROFIBUS DP.

Single PROFIBUS masters can exchange I/O data with AS-Interface in cyclic mode; masters with acyclic services can exchange I/O data and perform master calls. The DP/AS-Interface Link 20E cannot be used together with the extender.

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg
DP/AS-Interface Link 20E Router between PROFIBUS DP and AS-Interface in degree of protection IP20	A	**6GK1 415-2AA01**		1	1 unit	543	0.242
Manuals DP/AS-Interface Link 20E Paper version including type and GSD files							
• German	C	**6GK1 971-2DS01-0AA0**		1	1 unit	540	0.921
• English	D	**6GK1 971-2DS01-0AA1**		1	1 unit	540	0.864
• French	D	**6GK1 971-2DS01-0AA2**		1	1 unit	540	0.909
• Spanish	D	**6GK1 971-2DS01-0AA3**		1	1 unit	540	0.923
• Italian	D	**6GK1 971-2DS01-0AA4**		1	1 unit	540	0.912

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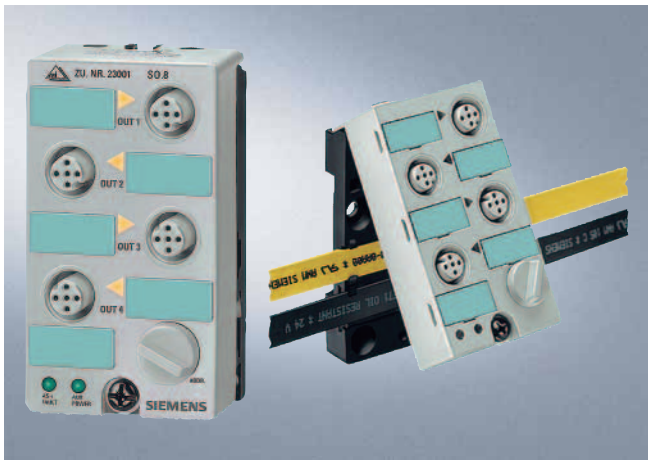
I/O modules for operation in the field
Introduction

Overview

K60

K20



K45

Three coordinated series of AS-Interface compact modules with digital and analog compact modules and a high degree of protection are available for operation in the field:

- Series K60 (digital and analog)
- Series K45 (digital)
- Series K20 (digital)

All compact modules are characterized by particularly simple handling. The K60 and K45 modules are mounted with a mounting plate. The mounting plate is used to receive the AS-Interface flat cables and enables mounting on a wall or standard mounting rail.

The K20 modules are directly mounted without a mounting plate and connected to the AS-Interface using a round cable.

Overview of digital compact modules

The following table provides an overview of the important features of the digital compact modules. For exact details, see the section *Technical Specifications* in the chapter on the respective product.

Version	K60	K45	K20
8 inputs / 2 outputs	✓	--	--
8 inputs	✓	--	--
4 inputs / 4 outputs	✓	--	✓
4 inputs / 3 outputs	✓	--	--
4 inputs / 2 outputs	✓	--	--
4 inputs	✓	✓	✓
2 inputs / 2 outputs	--	✓	✓
4 outputs	✓	✓	--
3 outputs	--	✓	--
AS-Interface connection	Flat cable / round cable	Flat cable	Round cable
I/O connection method	M12	M12 / M8	M12 / M8
Pin assignment	Standard / Y-II / Y	Standard / Y	Standard / Y
Degree of protection	IP65/67/68/69K	IP65/67	IP65/67
ATEX 3D (Zone 22)	✓	--	--
Extended address mode	✓	✓	✓

✓ Available
-- Not available

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Overview

The K60 digital AS-Interface compact modules are characterized by optimized handling characteristics and user-friendliness. They permit the assembly times and start-up times of AS-Interface to be reduced by up to 40 %.

Assembly of the K60 modules is performed with a mounting plate which accommodates the AS-Interface shaped cables. Two different mounting plates are offered for

- Wall mounting
- Standard rail mounting

Addressing of the K60 modules is performed using an addressing socket integrated in the compact module. The addresses can also be assigned after installed.

K60 compact modules with a maximum of four digital inputs and outputs

These compact modules contain the communication electronics and the M12 standard connections for inputs and outputs. Using M12 standard connectors, a maximum of four sensors and four actuators can be simply and reliably connected to the compact module.

The mounting plate and the compact module are joined together by means of a screw, with simultaneous contacting of the AS-Interface cable by the service-proven insulation piercing method.

K60 compact modules with a maximum of eight digital inputs

These modules have eight digital inputs for connection through M12 connectors.

The module requires two AS-Interface addresses for processing all eight inputs. As with every compact module, the addressing can be performed through a double addressing socket.

K60 compact modules with a four digital inputs and outputs according to AS-i Specification 3.0

The new AS-i Specification 3.0 adds a number of completely new features to the AS-Interface bus system. The extended address mode (A/B addresses) enables the connection of up to 62 slaves on one AS-i network. With the extended address mode according to Specification 3.0, four outputs are now possible even with A/B slaves (instead of only three outputs possible up to now with Specification 2.1). Hence with full expansion of an AS-i network, there are now 248 inputs as well as 248 outputs available on one AS-i system. Modules with four inputs and four outputs as A/B slaves according to Specification 3.0 are also available as K60 compact modules.

Please note that these modules can be used only with a new master according to AS-i Specification 3.0 (e.g. the new DP/AS-i LINK Advanced or IE/AS-i LINK PN IO) and that the cycle times for the outputs can extend to max. 20 ms.

K60 data couplers

An AS-Interface data coupler has been added to the K60 compact module range. Integrated in this module are two AS-i slaves which are connected to two different AS-i networks. Each of the two integrated slaves has four virtual inputs and four virtual outputs. The bidirectional data transmission of 4 data bits between two AS-i networks is thus possible in a simple and cost-effective manner. The data coupler need its own address in each AS-i network.

Each AS-i network works with a different cycle time depending on the number of stations. Hence two AS-i networks are not necessarily synchronous. For this reason the AS-i data coupler can be used to transmit only standard data and no safe data.

K60 compact modules for use in hazardous areas (ATEX)

Two versions of the K60 modules are available for operation in Zone 22 hazardous areas according to Classification II 3D (dusty atmosphere, non-conductive dust). The version with four inputs and four outputs has the designation (Ex) II 3D T75 °C IP65X and the version with four inputs has the designation (Ex) II 3D T60 °C IP65X.

Special conditions have to be observed for the safe operation of these devices. In particular the module must be protected by suitable measures from mechanical damage. Other conditions for safe operation, see section *Technical Specifications* in the Technical Information LV 1 T.

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I/O modules for operation in the field
Digital I/O modules, IP67 - K60

Selection and ordering data

Version				DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 400-1DQ00-0AA3	**Digital I/O modules, IP67 – K60** • PNP transistor • Current carrying capacity of the inputs: 200 mA • Connection method: M12 • Modules supplied without mounting plate									
Type	Current carrying capacity of outputs	Slave type	Pin assignment							
8 inputs/ 2 outputs	2 A	A/B	Special	A	**3RK2 400-1HQ00-0AA3**		1	1 unit	121	0.210
8 inputs	--	Standard	Y-II	►	**3RK1 200-0DQ00-0AA3**		1	1 unit	121	0.195
	--	A/B		►	**3RK2 200-0DQ00-0AA3**		1	1 unit	121	0.191
4 inputs/ 4 outputs	2 A	A/B (Spec. 3.0)	Y-II	►	**3RK2 400-1DQ00-0AA3**		1	1 unit	121	0.212
	2 A	Standard	Y-II	►	**3RK1 400-1DQ00-0AA3**		1	1 unit	121	0.209
	2 A	Standard	Standard	►	**3RK1 400-1CQ00-0AA3**		1	1 unit	121	0.209
	1 A	Standard	Y-II	►	**3RK1 400-1DQ01-0AA3**		1	1 unit	121	0.208
	1 A	Standard	Standard	►	**3RK1 400-1DQ03-0AA3**		1	1 unit	121	0.207
4 inputs/ 3 outputs	2 A	A/B	Y-II	►	**3RK2 400-1FQ03-0AA3**		1	1 unit	121	0.212
4 inputs/ 2 outputs	2 A	Standard	Y-II	►	**3RK1 400-1MQ00-0AA3**		1	1 unit	121	0.206
4 inputs	--	Standard	Y-II	►	**3RK1 200-0CQ00-0AA3**		1	1 unit	121	0.204
2x2 inputs / 2x2 outputs	1 A	Standard	Y	B	**3RK1 400-1DQ02-0AA3**		1	1 unit	121	0.205
4 outputs	2 A	Standard	Y-II	►	**3RK1 100-1CQ00-0AA3**		1	1 unit	121	0.204
	Digital I/O modules IP67 – K60 **Version ATEX (Ex) II 3D IP65 X** • PNP transistor • Current carrying capacity of the inputs: 200 mA • Connection method: M12 • Modules supplied without mounting plate									
Type	Current carrying capacity of outputs	Slave type	Pin assignment							
4 inputs/ 4 outputs	2 A	Standard	Y-II	C	**3RK1 400-1DQ05-0AA3**		1	1 unit	121	0.209
4 inputs	--	Standard	Y-II	B	**3RK1 200-0CQ05-0AA3**		1	1 unit	121	0.204
	Digital I/O modules IP67 – K60 data couplers • Modules supplied without mounting plate									
Type	Current carrying capacity of outputs	Slave type	Pin assignment							
Data coupler 4 inputs / 4 outputs (virtual)	--	Standard		C	**3RK1 408-8SQ00-0AA3**		1	1 unit	121	0.200
Accessories										
3RK1 901-0CA00	**K60 mounting plates** suitable for all K60 compact modules									
	• Wall mounting			►	**3RK1 901-0CA00**		1	1 unit	121	0.065
	• Standard rail mounting			►	**3RK1 901-0CB01**		1	1 unit	121	0.095
3RK1 901-1KA00	**AS-Interface sealing caps M12** for free M12 sockets			►	**3RK1 901-1KA00**		100	10 units	121	0.100
3RK1 901-1KA01	**AS-Interface sealing caps M12, tamper-proof** for free M12 sockets			A	**3RK1 901-1KA01**		100	10 units	121	0.100
3RK1 902-0AR00	**Sealing sets** • For K60 mounting plate and standard distributor • Cannot be used for K45 mounting plate • One set contains one straight and one shaped seal			B	**3RK1 902-0AR00**		100	5 sets	121	0.100

* You can order this quantity or a multiple thereof.

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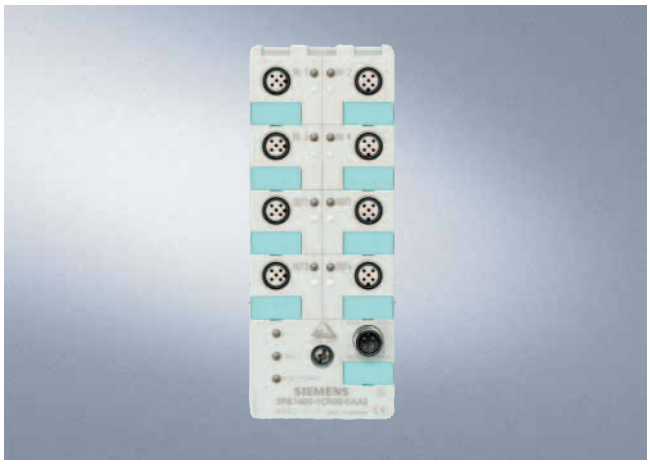
Overview



Modules with degree of protection IP67 cannot be used in areas exposed to permanently high levels of humidity, in applications with drilling emulsions and cutting oils or when cleaning with high-pressure cleaners. The answer for these applications is provided by the expansion of the K60 compact modules with the K60R module with degree of protection IP68/IP69K.

The K60R modules are connected instead of the AS-Interface flat cable using a round cable with M12 cable box.
The AS-Interface bus cable and the 24 V DC auxiliary voltage are routed in this case in a shared round cable.

IP68 protection permits many new applications, which were impossible with the former field modules with degree of protection IP67. In applications such as filling plants or machine tools the K60R with degree of protection IP68 enables the module to be used directly in zones exposed to permanent loading by humidity. It is thus possible to make even more rigorous savings in wiring with AS-Interface. IP68 test conditions see section *Tests IP68/IP69K* on page 2/32.

Cleaning with high-pressure cleaners, such as is regularly performed in the food drinks industry for instance, is possible without difficulty (IP69K).

In applications with tow chains, many users rely on placing the AS-Interface bus cable in a round cable. With the K60R module there is a round cable connection for direct connection to a round cable. No adapter is required.

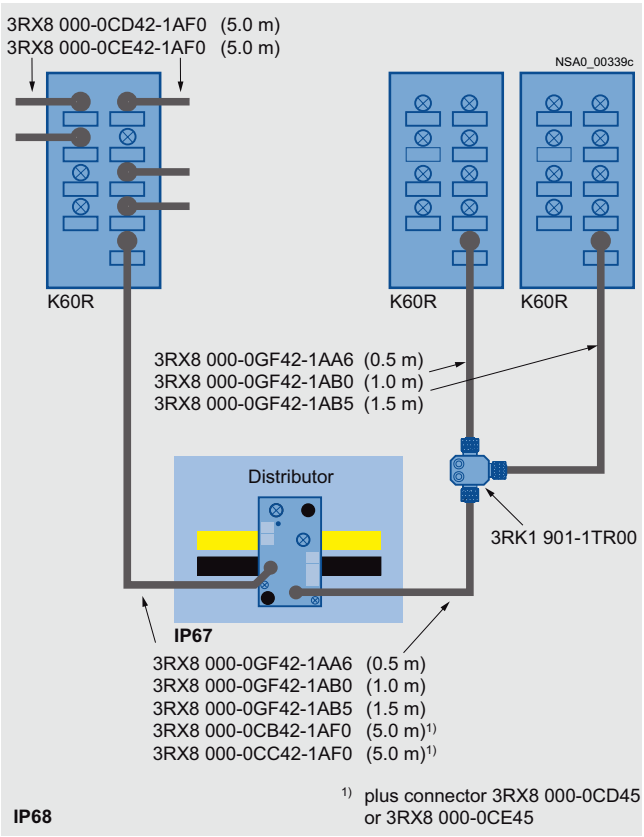
Mounting

The same mounting plates are used as for the K60 modules. Instead of using flat cables the K60R is connected using a 4-pole round cable with an M12 connection. With the K60R the mounting plate thus serves only as a fixture and ground terminal.

Addressing

Addressing is performed using the same socket as for the bus connection. Connecting the module to the 3RK1 904-2AB01 addressing unit is performed using a standard M12 cable (e.g. 3RX8 000-0GF32-1AB5). If the older version of the 3RK1 904-2AB00 addressing unit is used, a special addressing cable (3RK1 901-3RA00) is required. When the mounting is finished, the module is connected with the addressing cable to the addressing unit and addressed. The addressing cable is then removed and the module connected to the bus cable.

Connection



K60R connection options

In the IP67 environment the service-proven standard components are connected using flat cables. Spur lines are laid into the IP68 environment by means of an AS-Interface M12 feeder (3RK1 901-1NR..). The module is connected with a round cable to an M12 cable box. For this purpose the module has an M12 bus connection instead of the former addressing socket. The AS-Interface bus cable and the 24 V DC auxiliary power supply are routed together in a 4-pole round cable. There must be no ground conductor in this round cable. Connection to ground is made through the mounting plate.

In the IP68 environment only cables with extruded M12 connectors may be used. These cables are available preassembled as an M12 cable plug/cable box version:

- 3RX8 000-0GF42-1AA6: 0.5 m long
- 3RX8 000-0GF42-1AB0: 1.0 m long
- 3RX8 000-0GF42-1AB5: 1.5 m long

To connect the distributor and the K60R module over long distances it is also possible to use freely configurable cables with an M12 cable box and an open cable end, which are fitted with an M12 connector (straight version: 3RX8 000-0CD45, 3RX8 000-0CE45 angle plug) and connected to the distributor. This cable is available in two versions:

- 3RX8 000-0CB42-1AF0: 5 m long, with M12 cable box
- 3RX8 000-0CC42-1AF0: 5 m long, with M12 angle cable box

To connect more than one K60R module to one spur line, the spur line can be split again using a T distributor (3RK1 901-1TR00) with IP68 protection.

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I/O modules for operation in the field
Digital I/O modules, IP68 / IP69K - K60R

Please note the following conditions:

- The configuration guidelines for AS-Interface apply. For all M12 connecting cables the maximum permissible current is limited to 4 A. The cross-section of these cables amounts to just 0.34 mm². For connection of the K60R modules, the aforementioned M12 connecting cables can be used for the spur lines. The voltage drop caused by the ohmic resistance (approx. 0.11 Ω/m) must be taken into account.
- For round cable connections with shared AS-i and U_{AUX} in a single cable, the following maximum lengths apply:
  - Per spur line from feeder to module: maximum 5 m
  - Total of all round cable segments in an AS-Interface network: maximum 20 m

Tests IP68/IP69K

K60R modules were tested with the following tests:

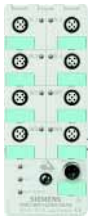
- Stricter test than IP67:
  90 min in 1.8 m depth of water (IP67: 30 min at 1 m depth of water)
- Salt water test:
  Five months in salt water, 20 cm deep, at room temperature
- Test with particularly creepable oil:
  Five months completely under oil at room temperature
- Test with drilling emulsion:
  Five months at room temperature (components of the drilling emulsion: Anionic and non-ionic emulsifiers, paraffinic low-aromatic mineral oil, boric acid alkanolamines, corrosion inhibitors, oil content 40 %)
- Test in oil bath (Excelence 416 oil) with alternating oil bath temperature:
  130 cycles of 15 °C to 55 °C, two months
- Cleaning with a high-pressure cleaner according to IP69K:
  80 bar to 100 bar, 10 cm to 15 cm distance, time per side > 30 sec, water temperature 80 °C

To simulate requirements as realistically as possible the modules were artificially aged prior to the tests by 15 temperature cycles of -25/+85 °C. During the test the modules were connected to 3RX1 connecting cables. Unassigned connections were closed with 3RK1 901-1KA00 sealing caps.

Note:

Sealing caps and M12 connections must be tightened with the correct torque

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 400-1CR00-0AA3	**Digital I/O modules IP68 / IP69K - K60R** • 4 inputs / 4 outputs • IP68/IP69K • Standard assignment • Current carrying capacity: - 200 mA (inputs) - 2 A (outputs) • Standard slave • Modules supplied without mounting plate	C	**3RK1 400-1CR00-0AA3**		1	1 unit	121	0.208
Accessories								
3RK1 901-0CA00	**K60 mounting plates** suitable for all K60 and K60R compact modules							
	• Wall mounting	►	**3RK1 901-0CA00**		1	1 unit	121	0.065
	• Standard rail mounting	►	**3RK1 901-0CB01**		1	1 unit	121	0.095
3RK1 901-1KA00	**AS-Interface sealing caps M12** for free M12 sockets	►	**3RK1 901-1KA00**		100	10 units	121	0.100

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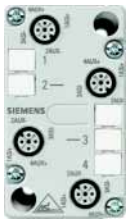
Version				DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RX9 801-0AA00	**AS-Interface M12 feeders**									
	for flat cable	for	Cable length	Cable end in feeder						
	AS-i	M12 socket	--	available	▶	**3RX9 801-0AA00**		1	1 unit	121	0.029
3RK1 901-1NR10	**AS-Interface M12 feeders**									
	for flat cable	for	Cable length	Cable end in feeder						
	AS-i	M12 socket	--	not available	A	**3RK1 901-1NR10**		1	1 unit	121	0.060
3RK1 901-1NR11	AS-i	M12 cable box	1 m	not available	A	**3RK1 901-1NR11**		1	1 unit	121	0.070
	AS-i	M12 cable box	2 m	Not available	A	**3RK1 901-1NR12**		1	1 unit	121	0.100
3RK1 901-1NR21	AS-i / U_{aux}	M12 socket	--	not available	A	**3RK1 901-1NR20**		1	1 unit	121	0.060
	AS-i / U_{aux}	M12 cable box	1 m	not available	A	**3RK1 901-1NR21**		1	1 unit	121	0.070
	AS-i / U_{aux}	M12 cable box	2 m	not available	A	**3RK1 901-1NR22**		1	1 unit	121	0.100
 3RK1 901-1NR00	**AS-Interface quadruple M12 feeders**									
	for flat cable	for	Cable length	Cable end in feeder						
	AS-i / U_{aux}	Quadruple M12 socket Supplied with coupling module	--	available	A	**3RK1 901-1NR00**		1	1 unit	121	0.186
3RK1 901-1TR00	**M12-T distributors** • IP68 • 1 x M12 connector • 2 x M12 box				C	**3RK1 901-1TR00**		1	1 unit	121	0.038
3RK1 901-3RA00	**M12 addressing cables** • For K60R addressing modules • Required only for 3RK1 904-2AB00 addressing unit; if the latest version of the 3RK1 904-2AB01 addressing unit is used, the addressing is performed with a standard 3RX8 000-0GF32-1AB5 M12 cable				C	**3RK1 901-3RA00**		1	1 unit	121	0.064

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I/O modules for operation in the field
Digital I/O modules, IP67 - K45

Overview

The K45 compact modules are the ideal supplement to the K60 large compact modules, which have proven their worth in industry. They are the logical consequence for rounding off the bottom end of the existing product spectrum.

The acclaimed advantages of the existing K60 compact modules are fully emulated by the far smaller K45 modules. Their footprint is the same as that of the user modules. However, they have a mounting depth which is only two-thirds of the user module and hence an exact match for the compact module family.

Yet in spite of these small dimensions all the modules have large labels and an integrated addressing socket.

Two mounting plates are offered for the K45 compact modules:

- The mounting plate for wall mounting has a hole pattern that is identical to that of the K60 compact modules. This means that K60 compact modules can be mounted together with K45 modules in an aligned arrangement. The flat cables can be inserted in the recesses of the mounting plates where they cause no hindrance.
- The mounting plate for standard rail mounting has a hole pattern that is identical to that of the user modules.

Mounting the flat cables is now easier than ever. The yellow and black AS-Interface flat cable can be inserted into the mounting plates from the left or right regardless of the position of the coding lug. The correct polarity of the applied voltages is always guaranteed.

Sensors/actuators are connected using M12 sockets. The 4I module can be ordered optionally with M8 connection sockets.

Selection and ordering data

3RK1 400-0GQ20-0AA3

Digital I/O modules, IP67 – K45

- PNP transistor
- Current carrying capacity of the inputs: 200 mA
- Modules supplied without mounting plate

Type	Current carrying capacity of outputs	Slave type	Pin assignment	Connection method	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
4 inputs	--	Standard	Standard	M12	▶	**3RK1 200-0CQ20-0AA3**		1	1 unit	121	0.086
	--	Standard	Standard	M8 screw	A	**3RK1 200-0CT20-0AA3**		1	1 unit	121	0.098
	--	Standard	Standard	M8 snap	C	**3RK1 200-0CU20-0AA3**		1	1 unit	121	0.091
	--	A/B	Standard	M12	▶	**3RK2 200-0CQ20-0AA3**		1	1 unit	121	0.099
	--	A/B	Standard	M8 screw	B	**3RK2 200-0CT20-0AA3**		1	1 unit	121	0.100
	--	A/B	Standard	M8 snap	C	**3RK2 200-0CU20-0AA3**		1	1 unit	121	0.102
2 x 2 inputs	--	A/B	Y	M12	A	**3RK2 200-0CQ22-0AA3**		1	1 unit	121	0.100
2 inputs/ 2 outputs	2 A[1)]	Standard	Standard	M12	▶	**3RK1 400-1BQ20-0AA3**		1	1 unit	121	0.100
2 x (1 input/ 1 output)	0.2 A	Standard	Y	M12	A	**3RK1 400-0GQ20-0AA3**		1	1 unit	121	0.098
4 outputs	1 A	Standard	Standard	M12	▶	**3RK1 100-1CQ20-0AA3**		1	1 unit	121	0.100
3 outputs	1 A	A/B	Standard	M12	▶	**3RK2 100-1EQ20-0AA3**		1	1 unit	121	0.093
2 outputs / 2 inputs	2 A	A/B	Standard	M12	A	**3RK2 400-1BQ20-0AA3**		1	1 unit	121	0.100

[1)] The typical current carrying capacity per output increases with version "E12" from 1.5 to 2 A (available since approx. 07/2003).

*** You can order this quantity or a multiple thereof.**

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	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Accessories								
3RK1 901–2EA00	**K45 mounting plates**							
	• For wall mounting	►	**3RK1 901–2EA00**		1	1 unit	121	0.027
	• For standard rail mounting	►	**3RK1 901–2DA00**		1	1 unit	121	0.036
3RK1 901–1KA00	**AS-Interface sealing caps**							
	• For free M12 sockets	►	**3RK1 901–1KA00**		100	10 units	121	0.100
3RK1 901–1PN00	• For free M8 sockets	A	**3RK1 901–1PN00**		100	10 units	121	0.100
3RK1 901–1MN00	**Cable terminating pieces** for sealing of open cable ends (shaped AS-Interface cable) in IP67	►	**3RK1 901–1MN00**		1	10 units	121	0.085

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I/O modules for operation in the field
Digital I/O modules IP67 - K20

Overview

The K20 compact module range rounds off the AS-Interface compact modules with a particularly slim design and a width of a mere 20 mm. Thanks to its extremely compact dimensions, these modules are particularly suited for handling machine applications in the field of production engineering where modules need to be arranged in the smallest of spaces.

Robotics is yet another application area. Instead of the AS-Interface flat cable, the K20 modules are connected to AS-Interface over a round cable with M12 cable box. The AS-Interface bus cable and the 24 V DC auxiliary power supply are routed in this case in a shared round cable. This enables extremely compact installation.

The flexibility of the round cable means that it can also be used on moving machine parts without any problems. The K20 modules are also ideal for such applications as their non-encapsulated design makes them particularly light in weight.

In applications with tow chains, many users rely on placing the AS-Interface bus cable in a round cable. In this case, the K20 modules support direct connection to the round cable. No flat to round cable adapter is required.

The K20 compact module range includes standard AS-Interface modules, as well as an ASIsafe version for the connection of fail-safe sensors, such as EMERGENCY-STOP pushbuttons or protective door monitoring. All standard AS-Interface K20 modules support, as far as technically possible, the expanded address mode (A/B addresses) according to AS-Interface Specification 2.1, which enables connection of 62 stations to an AS-Interface network. The K20 module with four inputs and four outputs works in expanded address mode according to AS-Interface Specification 3.0 which, for the first time, supports four outputs with an A/B slave, thus enabling 248 inputs and 248 outputs in a fully expanded AS-Interface network.

For particularly space-saving dimensions, the sensors and actuators are connected over M8 plug-in connectors. Alternatively, M12 connectors with Y assignment can be used.

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Selection and ordering data

	Version					DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	Digital I/O modules, IP67 – K20											
	Type	Current carrying capacity of outputs	Slave type	Pin assign-ment	Connec-tion method							
3RK2 200-0CT30-0AA3	4 inputs	--	A/B	Standard	M8	A	**3RK2 200-0CT30-0AA3**		1	1 unit	121	0.075
		--	A/B	Y	M12	A	**3RK2 200-0CQ30-0AA3**		1	1 unit	121	0.075
	2 inputs/ 2 outputs	1	A/B	Standard	M8	A	**3RK2 400-1BT30-0AA3**		1	1 unit	121	0.075
		1	A/B	Y	M12	A	**3RK2 400-1BQ30-0AA3**		1	1 unit	121	0.075
	4 inputs/ 4 outputs	1	Standard	Standard	M8	A	**3RK1 400-1CT30-0AA3**		1	1 unit	121	0.110
		1	A/B (Spec. 3.0)	Standard	M8	A	**3RK2 400-1CT30-0AA3**		1	1 unit	121	0.110
	2 safe inputs	--	Standard	Y-II	M12	A	**3RK1 205-0BQ30-0AA3**		1	1 unit	121	0.075

Accessories

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	AS-Interface sealing caps							
3RK1 901-1KA00	• For free M12 sockets	►	**3RK1 901-1KA00**		100	10 units	121	0.100
3RK1 901-1PN00	• For free M8 sockets	A	**3RK1 901-1PN00**		100	10 units	121	0.100
3RK1 901-1NN00	**AS-Interface standard distributors, for AS-Interface flat cables** • Current carrying capacity up to 7 A • Delivery includes special mounting plate for wall and standard rail mounting • Seals (3RK1 902-0AR00) are required only if a cable is to be terminated in the distributor and must be ordered separately	►	**3RK1 901-1NN00**		1	1 unit	121	0.086
3RK1 901-1NN10	**AS-Interface compact distributors, for AS-Interface flat cables** Current carrying capacity up to 6 A	A	**3RK1 901-1NN10**		1	1 unit	121	0.040

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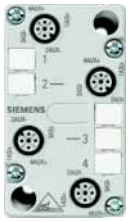
I/O modules for operation in the field
Digital I/O modules IP67 - K20

	Version				DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RX9 801-0AA00	**AS-Interface M12 feeders**										
	for flat cable	for	Cable length	Cable end in feeder							
	AS-i	M12 socket	--	available	▶	**3RX9 801-0AA00**		1	1 unit	121	0.029
3RK1 901-1NR10	**AS-Interface M12 feeders**										
	for flat cable	for	Cable length	Cable end in feeder							
	AS-i	M12 socket	--	not available	A	**3RK1 901-1NR10**		1	1 unit	121	0.060
3RK1 901-1NR11	AS-i	M12 cable box	1 m	not available	A	**3RK1 901-1NR11**		1	1 unit	121	0.070
	AS-i	M12 cable box	2 m	not available	A	**3RK1 901-1NR12**		1	1 unit	121	0.100
3RK1 901-1NR21	AS-i / U_{aux}	M12 socket	--	not available	A	**3RK1 901-1NR20**		1	1 unit	121	0.060
	AS-i / U_{aux}	M12 cable box	1 m	not available	A	**3RK1 901-1NR21**		1	1 unit	121	0.070
	AS-i / U_{aux}	M12 cable box	2 m	not available	A	**3RK1 901-1NR22**		1	1 unit	121	0.100
 3RK1 901-1NR00	**AS-Interface quadruple M12 feeders**										
	for flat cable	for	Cable length	Cable end in feeder							
	AS-i / U_{aux}	Quadruple M12 socket Supplied with coupling module	--	available	A	**3RK1 901-1NR00**		1	1 unit	121	0.186
3RK1 901-1TR00	**M12-T distributors** • IP68 • 1 x M12 connector • 2 x M12 box				C	**3RK1 901-1TR00**		1	1 unit	121	0.038
6ES7 194-1KA01-0XA0	**M12 Y-shaped coupler plugs** for connection of two sensors to one M12 socket with Y connector				▶	**6ES7 194-1KA01-0XA0**		1	1 unit	250	0.046
3RK1 901-3RA00	**Addressing cables, with jack plug, to M12** • For addressing K20 modules • Required only for 3RK1 904-2AB00 addressing unit • If the latest version of the 3RK1 904-2AB01 addressing unit is used, the addressing is performed with a standard M12 3RX8 000-0GF32-1AB5 cable					**3RK1 901-3RA00**		1	1 unit	121	0.064

For plug-in connectors and cables see Catalog FS 10, chapter "Proximity Switches / Accessories / Plug-in Connectors" or look in the Internet at www.siemens.com/as-interface.

* You can order this quantity or a multiple thereof.

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Overview

The AS-Interface user modules are the first module generation for AS-Interface. Today, innovated and further improved modules are available in the form of the K45 and K60 series of compact modules. We recommend replacing the user modules in future with the K45 compact module series. However, the user modules are still available for existing systems and replacement requirements.

You can find more information on the Internet at:

http://mall.ad.siemens.com

Advantages of the K45 compact modules

The K45 compact modules provide extra advantages in addition to the functionality of the user modules:

- An integrated addressing socket enables the module to be addressed in the installed state
- Time is saved when mounting the module: Mounting with only one screw thanks to hinge system
- Extensive diagnostics by LED on the module (e.g. display of zero address, no communication with master, overload)
- Random insertion of the AS-Interface flat cable irrespective of the position of the profiled lug
- Smaller dimensions
- Versions with M12 and M8 connection sockets enable the direct connection of all sensors
- Modules in A/B technology enable up to 62 slaves on one AS-Interface network

Conversion table for user modules --> K45

User modules		**Corresponding K45 type**	
Order No.	Version	**Order No.**	Version
3RG9 001-0AA00	4 inputs (100 mA)	3RK1 200-0CQ20-0AA3	4 inputs (200 mA)
3RG9 001-0AG00	4 inputs (200 mA)	3RK1 200-0CQ20-0AA3	4 inputs (200 mA)
3RG9 001-0AH00	2 x 2 inputs	3RK2 200-0CQ22-0AA3	2 x 2 inputs A/B slave
3RG9 001-0AC00	2 inputs / 2 outputs relay outputs	3RK1 400-1BQ20-0AA3	2 inputs / 2 outputs solid-state outputs
3RG9 001-0CC00	2 inputs / 2 outputs solid-state outputs	3RK1 400-1BQ20-0AA3	2 inputs / 2 outputs solid-state outputs
3RG9 001-0AM00	2 inputs / 2 outputs solid-state outputs U_{Aux} using M12 connector	3RK1 400-1BQ20-0AA3	2 inputs / 2 outputs solid-state outputs U_{Aux} using black flat cable
3RG9 001-0AJ00	2 x (1 input / 1 output) supply of I/O from AS-Interface cable	3RK1 400-0GQ20-0AA3	2 x (1 input / 1 output) supply of I/O from AS-Interface cable
3RG9 001-0AB00	4 outputs relay outputs	3RK1 100-1CQ20-0AA3	4 inputs solid-state outputs
3RG9 001-0AL00	4 outputs U_{Aux} using M12 connector	3RK1 100-1CQ20-0AA3	4 outputs U_{Aux} using black flat cable
3RG9 001-0CB00	4 inputs solid-state outputs	3RK1 100-1CQ20-0AA3	4 inputs solid-state outputs

Note:

To use the K45 modules you require the 3RK1 901-2EA00 (wall mounting) or 3RK1 901-2DA00 (standard rail mounting) K45 mounting plates instead of the 3RG9 010-0AA00 and 3RG9 030-0AA00 coupling modules.

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I/O modules for operation in the field
Analog I/O modules, IP67 - K60

Overview

AS-Interface analog modules from the K60 compact series detect or issue analog signals locally. These modules are linked to the higher level controller through an AS-Interface master according to Specification 2.1 or Specification 3.0.

The analog modules are divided into five groups:

- Input module for sensors with current signal
- Input module for sensors with voltage signal
- Input module for sensors with thermal resistor
- Output module for current actuators
- Output module for voltage actuators

The input modules according to Profile 7.3/7.4 are available with two or four input channels. It is possible in addition to convert the two-channel module to using only one input channel, thus enabling very short times before the analog value is available. The conversion is effected by means of a jumper plug at socket 3. The transmission times achieved with analog modules according to Profile 7.A.9 are half shorter by half than those achieved with Profile 7.3/7.4. Operation is adjustable in this case, e.g.it is possible to choose with the ID1 Code whether the module is operated with one or two channels.

The output modules are configured as two-channel modules as standard.

The input and output channels are electrically isolated from the AS-Interface network. If sensors with a higher power requirement are to be connected, more power can be supplied through the auxiliary voltage as an alternative to the internal supply.

In the manual the modules are presented in great detail along with their technical specifications and in-depth notes on operation. Sample function blocks round off the manual.

Benefits

- Analog modules are just as easy to integrate in AS-Interface as digital modules
- Analog values can be easily detected and issued locally
- Preprocessing of the analog value transmission in the master enables rapid evaluation of the analog values
- Up to four values can be detected using one analog module
- Extremely fast transmission and conversion of analog values thanks to the new option for changing over to single-channel operation

In addition, Specification 3.0 now also offers:

- A/B technology, now also with analog modules
- On average, double fast transmission times (only 3 or 4 cycles, depending on the resolution selected)
- Variable adjustable mode: 12 bit or 14 bit resolution, 1 or 2-channel, selectable over the ID1 code
- Extra simple handling of analog processing with masters of Specification 3.0, the DP/AS-i Link Advanced

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Selection and ordering data

Version			DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 207-1BQ44-0AA3	**Analog I/O modules IP67 - K60, analog profile 7.3** • Slave type: Standard • Modules supplied without mounting plate								
Inputs	Type	Measuring range							
1 or 2 inputs (switch-select-able by means of a jumper plug at socket 3)	Current	4 ... 20 mA or ± 20 mA (selectable)	A	**3RK1 207-1BQ40-0AA3**		1	1 unit	121	0.187
	Voltage	± 10 V or 1 ... 5 V (selectable)	A	**3RK1 207-2BQ40-0AA3**		1	1 unit	121	0.188
	Thermal resistance	Pt 100 or Ni 100 or 0 ... 600 Ω (selectable)	A	**3RK1 207-3BQ40-0AA3**		1	1 unit	121	0.183
4 inputs	Current	4 ... 20 mA or ± 20 mA (selectable)	A	**3RK1 207-1BQ44-0AA3**		1	1 unit	121	0.190
	Voltage	± 10 V or 1 ... 5 V (selectable)	C	**3RK1 207-2BQ44-0AA3**		1	1 unit	121	0.190
	Thermal resistance	Pt 100 or Ni 100 or 0 ... 600 Ω (selectable)	A	**3RK1 207-3BQ44-0AA3**		1	1 unit	121	0.190
Outputs	Type	Output range							
2 outputs	Current for 2-wire actuators	4 ... 20 mA or ± 20 mA or 0 ... 20 mA (selectable)	A	**3RK1 107-1BQ40-0AA3**		1	1 unit	121	0.200
	Voltage for 2-wire actuators	± 10 V or 0 ... 10 V or 1 ... 5 V (selectable)	A	**3RK1 107-2BQ40-0AA3**		1	1 unit	121	0.200
3RK2 207-2BQ50-0AA3	**Analog I/O modules IP67 - K60, analog profile 7.A.9** • Slave type: A/B (Spec. 3.0) • Modules supplied without mounting plate								
Inputs	Type	Measuring range							
1 or 2 inputs (variably adjustable)	Current	4 ... 20 mA or ± 20 mA (selectable)	A	**3RK2 207-1BQ50-0AA3**		1	1 unit	121	0.187
	Voltage	± 10 V or 1 ... 5 V (selectable)	A	**3RK2 207-2BQ50-0AA3**		1	1 unit	121	0.187

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I/O modules for operation in the field
Analog I/O modules, IP67 - K60

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Accessories								
	Manual, German **Only available to download on the Internet:** http://www.siemens.com/automation/manuals							
 3RK1 901-0CA00	**K60 mounting plates** • Wall mounting	►	**3RK1 901-0CA00**		1	1 unit	121	0.065
	• Standard rail mounting	►	**3RK1 901-0CB01**		1	1 unit	121	0.095
 3RK1 901-1KA00	**M12 sealing caps**	►	**3RK1 901-1KA00**		100	10 units	121	0.100
 3RK1 902-0AR00	**Sealing sets** • For mounting plate K60 and distributor • Cannot be used for K45 mounting plate • One set contains one straight and one shaped seal	B	**3RK1 902-0AR00**		100	5 sets	121	0.100
 3RK1 901-1AA00	**Jumper plugs** for changing over the 2-channel input modules	A	**3RK1 901-1AA00**		1	1 unit	121	0.012

Further information is available on the Internet at:

http://mall.ad.siemens.com

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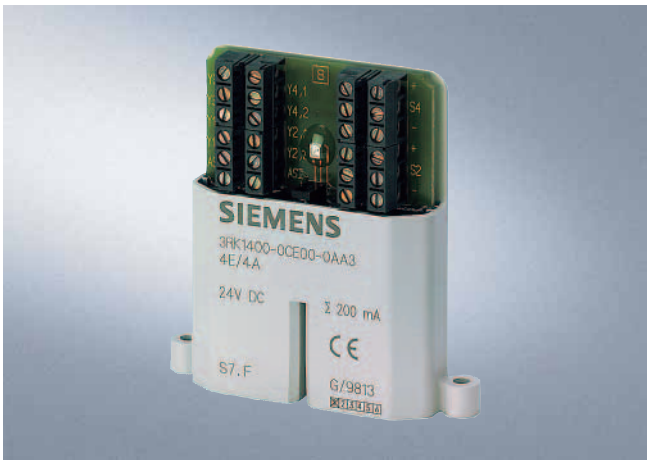
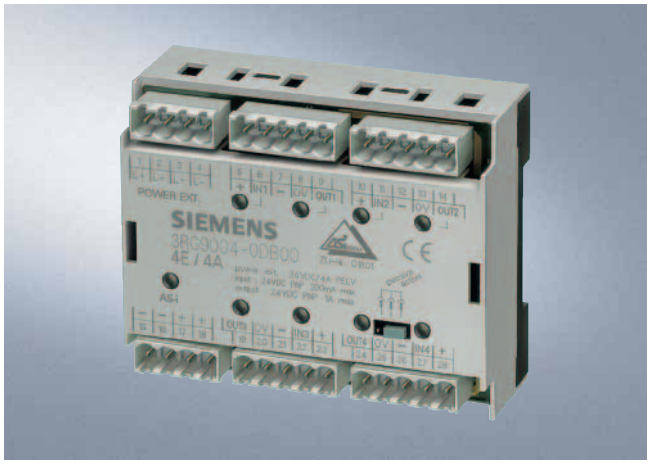
Overview

SlimLine S22.5/S45



Flat module



F90 module

For AS-Interface applications inside cabinets there are various module series for the most diverse requirements:

- SlimLine S22.5
- SlimLine S45
- F90 module
- Flat module

All modules of these series can be snap-mounted directly on a standard mounting rail or be fastened using screws.

AS-Interface modules in IP20 have direct terminals for the AS-Interface cables and therefore do not require a lower part.

Series	Spectrum	Mounting on TH35 standard mounting rail according to EN 60715	Wall mounting using push-in lugs (Order No.: 3RP1 903)	Other possibilities
SlimLine S22.5	• 4I (standard and A/B modules) • 4O • 2I/2O (steady-state/relay outputs) • Counters[1)] • Ground-fault detection modules[1)]	✓	✓	--
SlimLine S45	• 4I/4O (steady-state/relay outputs) • 4I/4O with floating I/Os • 4I/3O (A/B modules) • 4I/4O (A/B modules Spec. 3.0)	✓	✓	--
F90 modules	• 4I/4O (screw terminal connection) • 4I/4O (connection using Combicon connector) • 16I	✓	--	--
Flat modules	• 4I/4O (screw terminal connection)	--	--	Integrated lugs for screw fixing

1) More information about these modules:
See Catalog LV 1 / chapter *Systems* / section *AS-Interface* / *Slaves* / *Modules with Special Functions*
See A&D Mall / section *Low-Voltage Controls* / *SIRIUS Industrial Controls* / *Systems* / *AS-Interface* / *Slaves* / *Modules with Special Functions*

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I/O modules for operation in the control cabinet, IP20, SlimLine

Overview

SlimLine modules of the S22.5 and S45 series

The AS-Interface series of modules for the "SlimLine" cabinet with degree of protection IP20 creates space in the control cabinet and in distributed local boxes.

For these modules the priority was placed on a narrow type of construction. They have a width of only 22.5 or 45 mm.

Standard sensors/actuators and the AS-Interface cable can be connected using screw-type or spring-loaded terminals.

Integrated adapters enable mounting on a standard mounting rail. Disassembly from the standard mounting rail is quick and easy and requires no tools.

With an additional accessory, the modules can also be screwed on.

All modules are fitted at the front with LEDs which indicate the module's status.

An addressing socket integrated at the front enables the module to be addressed also when it is installed.

In addition to the digital input/output modules there are modules of S22.5 design with special functions. These include:

- Counter module
- Ground-fault detection module

More information about these modules, see

- Chapter *Systems* / section *AS-Interface* / *Slaves* / *Modules with Special Functions*
- A&D Mall: Section *Low-Voltage Controls* / *SIRIUS Industrial Controls* / *Systems* / *AS-Interface* / *Slaves* / *Modules with Special Functions*

The new AS-Interface Specification 3.0 adds a number of completely new features to AS-Interface bus system. The extended address mode (A/B addresses) enables the connection of up to 62 slaves on one AS-Interface network. With the extended address mode according to Specification 3.0, four outputs are now possible for the first time even with A/B slaves (instead of only three outputs possible up to now with Specification 2.1). Hence with full expansion of an AS-Interface network, there are now 248 inputs as well as 248 outputs available on one AS-Interface system.

Modules with four inputs and four outputs as A/B slaves according to Specification 3.0 are also available as SlimLine modules S45.

Note:

Please note that the modules according to Specification 3.0 can be used only with a new master according to AS-Interface Specification 3.0 (e.g. the new DP/AS-i LINK Advanced or IE/AS-i LINK PN IO) and that the cycle times for the outputs can extend to max. 20 ms.

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Selection and ordering data

3RK1 200-0CE00-0AA2

3RK1 400-1CE00-0AA2

Version					DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
S22.5 SlimLine modules Inputs: PNP transistor											
Type	Connection terminals	Slave type	Inputs	Outputs							
4 inputs	Screw	Standard	2-wire	--	▶	**3RK1 200-0CE00-0AA2**		1	1 unit	121	0.138
	Screw	Standard	2 and 3-wire	--	▶	**3RK1 200-0CE02-0AA2**		1	1 unit	121	0.141
	Screw	A/B slave	2 and 3-wire	--	▶	**3RK2 200-0CE02-0AA2**		1	1 unit	121	0.145
	Spring	Standard	2-wire	--	A	**3RK1 200-0CG00-0AA2**		1	1 unit	121	0.115
	Spring	Standard	2 and 3-wire	--	A	**3RK1 200-0CG02-0AA2**		1	1 unit	121	0.117
	Spring	A/B slave	2 and 3-wire	--	A	**3RK2 200-0CG02-0AA2**		1	1 unit	121	0.122
2 inputs/ 2 outputs	Screw	Standard	2-wire	PNP transistor 2 A	▶	**3RK1 400-0BE00-0AA2**		1	1 unit	121	0.139
	Screw	Standard	2-wire	Relays	▶	**3RK1 402-0BE00-0AA2**		1	1 unit	121	0.165
	Spring	Standard	2-wire	PNP transistor 2 A	B	**3RK1 400-0BG00-0AA2**		1	1 unit	121	0.112
	Spring	Standard	2-wire	Relays	B	**3RK1 402-0BG00-0AA2**		1	1 unit	121	0.145
4 outputs	Screw	Standard	--	PNP transistor 1 A	▶	**3RK1 100-1CE00-0AA2**		1	1 unit	121	0.138
	Spring	Standard	--	PNP transistor 1 A	A	**3RK1 100-1CG00-0AA2**		1	1 unit	121	0.114
S45 SlimLine modules Inputs: PNP transistor											
Type	Connection terminals	Slave type	Inputs	Outputs							
4 inputs/ 4 outputs	Screw	Standard	2 and 3-wire	PNP transistor 1A	▶	**3RK1 400-1CE00-0AA2**		1	1 unit	121	0.291
		Standard	2 and 3-wire	PNP transistor 2 A	▶	**3RK1 400-1CE01-0AA2**		1	1 unit	121	0.289
		Standard	2 and 3-wire floating	PNP transistor 1 A floating	▶	**3RK1 402-3CE01-0AA2**		1	1 unit	121	0.287
		Standard	2 and 3-wire	Relays	▶	**3RK1 402-3CE00-0AA2**		1	1 unit	121	0.316
		A/B (Spec. 3.0)	2 and 3-wire	PNP transistor 2 A	B	**3RK2 400-1CE01-0AA2**		1	1 unit	121	0.289
	Spring	Standard	2 and 3-wire	PNP transistor 1 A	A	**3RK1 400-1CG00-0AA2**		1	1 unit	121	0.243
		Standard	2 and 3-wire	PNP transistor 2 A	B	**3RK1 400-1CG01-0AA2**		1	1 unit	121	0.241
		Standard	2- and 3-wire floating	PNP transistor 1 A floating	A	**3RK1 402-3CG01-0AA2**		1	1 unit	121	0.239
		Standard	2 and 3-wire	Relays	A	**3RK1 402-3CG00-0AA2**		1	1 unit	121	0.272
		A/B (Spec. 3.0)	2 and 3-wire	PNP transistor 2 A	B	**3RK2 400-1CG01-0AA2**		1	1 unit	121	0.241
4 inputs / 3 outputs	Screw	A/B slave	2 and 3-wire	PNP transistor 2 A	▶	**3RK2 400-1FE00-0AA2**		1	1 unit	121	0.294
	Spring	A/B slave	2 and 3-wire	PNP transistor 2 A	A	**3RK2 400-1FG00-0AA2**		1	1 unit	121	0.247
Accessories											
Sealable covers to secure against unauthorized addressing					▶	**3RP1 902**		1	5 units	101	0.004
Push-in lugs for screw mounting					▶	**3RP1 903**		1	10 units	101	0.002
SlimLine opening tools • For all devices with spring-loaded terminal connections up to max. 1.5 mm² conductor cross-section • Partially insulated					A	**8WA2 807**		1	1 unit	041	0.023

*** You can order this quantity or a multiple thereof.**

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I/O Modules for operation in the control cabinet, IP20, F90 modules

Selection and ordering data

Version				DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RG9 002-0DB00	**Modules F90** Standard slave									
Type	Connection	Inputs	Outputs							
4 inputs/ 4 outputs	Screw	2- and 3-wire PNP transistor	PNP transistor 1A	A	**3RG9 002-0DB00**		1	1 unit	121	0.112
		2- and 3-wire PNP transistor	PNP transistor 2A	A	**3RG9 002-0DA00**		1	1 unit	121	0.112
		2- and 3-wire PNP transistor floating	PNP transistor 2A	A	**3RG9 002-0DC00**		1	1 unit	121	0.111
	Combicon	2- and 3-wire PNP transistor	PNP transistor 1A	A	**3RG9 004-0DB00**		1	1 unit	121	0.090
		2- and 3-wire PNP transistor	PNP transistor 2A	A	**3RG9 004-0DA00**		1	1 unit	121	0.090
		2- and 3-wire PNP transistor floating	PNP transistor 2A	A	**3RG9 004-0DC00**		1	1 unit	121	0.107
16 inputs	Screw	PNP transistor	--	A	**3RG9 002-0DE00**		1	1 unit	121	0.133
	Combicon	PNP transistor	--	A	**3RG9 004-0DE00**		1	1 unit	121	0.086
Accessories										
Combicon connector sets ▶ • For 4I/4O modules with Combicon connection One set comprises: - 4 x 5-pole plug for connection - Standard sensors/actuators - 2 x 4-pole plug for AS-Interface and external auxiliary voltage					**3RX9 810-0AA00**		1	1 unit	121	0.062

I/O modules for operation in the control cabinet, IP20, Flat modules

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 400-0CE00-0AA3 **Flat modules** • 4 inputs/ 4 outputs • 200 mA for all I/Os • Screw-type terminals	A	**3RK1 400-0CE00-0AA3**		1	1 unit	121	0.097

* You can order this quantity or a multiple thereof.

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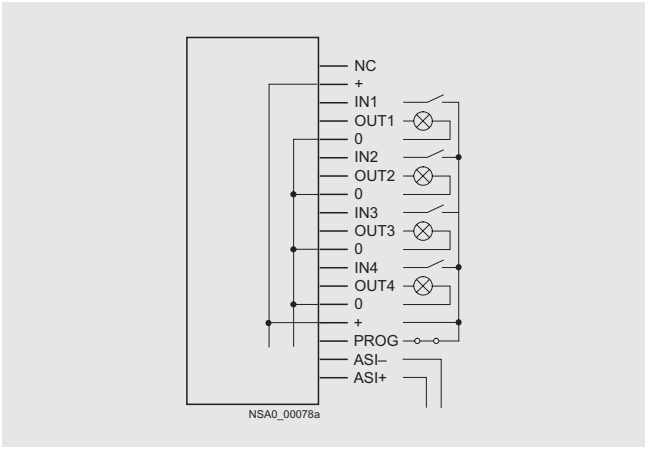
Overview

3RK1 400-0CD00-0AA3
AS-Interface communications module for printed circuit board installation

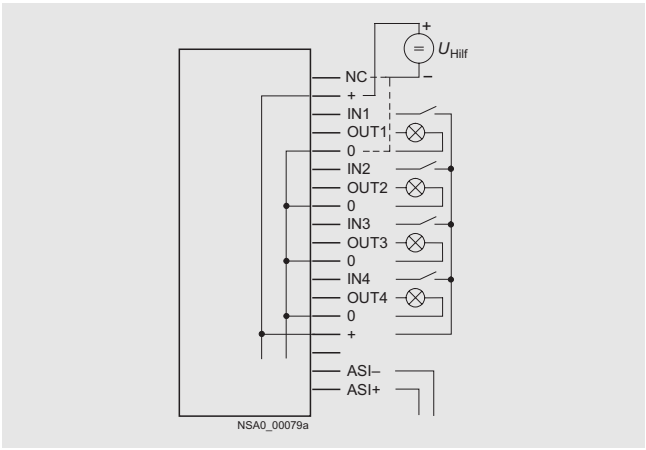


With the 4I/4O module for printed circuit board mounting it is possible for up to four mechanical contacts to be queried or indicator lights to be operated, the necessary power being provided by the AS-Interface system (yellow AS-Interface cable).

Note:

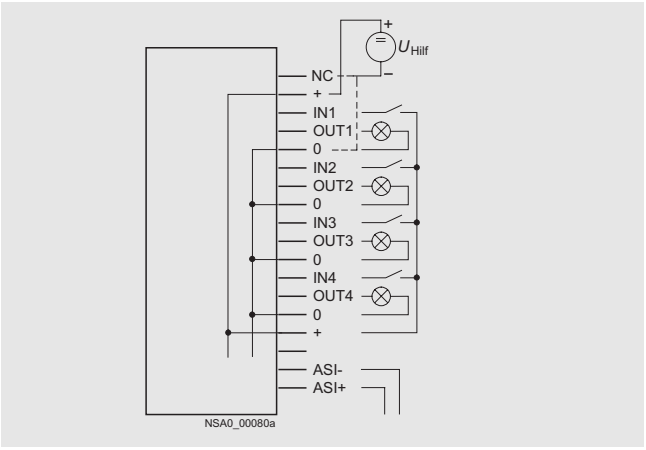
If the switching outputs are overloaded, the module does not respond to invoking by a master.

3RK1 400-0CD01-0AA3
AS-Interface communications module for printed circuit board installation



With the 4I/4O module for printed circuit board mounting it is possible for up to four mechanical contacts to be queried or indicator lights to be operated, the necessary power for the inputs and outputs being provided from the auxiliary voltage (24 V PELV). If (+) is connected to U_{aux} + and (NC) to U_{aux} -, the outputs are not short-circuit and overload resistant; if U_{aux} - is connected to (0), the outputs are overload and short-circuit resistant (maximum summation current 200 mA). In this case the module does not respond even to invoking by a master when the switching outputs are overloaded.

3RG9 005-0SA00
AS-Interface communications module for printed circuit board installation



With the 4I/4O module for printed circuit board mounting it is possible for up to four mechanical contacts to be queried or indicator lights to be operated, the power for inputs and outputs being provided from an auxiliary voltage (24 V PELV). If (+) is connected to U_{aux} + and (NC) to U_{aux} -, the outputs are not short-circuit and overload resistant; if U_{aux} - is connected to (0), the outputs are overload and short-circuit resistant (maximum summation current 200 mA). In this case the module does not respond even to invoking by a master when the switching outputs are overloaded.

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Special integrated solutions
AS-Interface communications modules

3RK1 400-1CD00-0AA2
AS-Interface communications module for printed circuit board installation

Connection	Connection pad[1)]
ASi+	27, 29
ASi-	28, 30
Sensor+	17, 18, 23, 24
Sensor-	13, 14, 19, 20
IN1	21
IN2	22
IN3	15
IN4	16
U_{aux} + (L24+)	2, 4
U_{aux} - (M24)	1, 3
OUT1	9
OUT2	10
OUT3	5
OUT4	6
OUT-	7, 8
Not assigned	11, 12, 25, 26

1) Note: Pad numbering, see section *Dimensional Drawings* in the LV1 T "Technical Information".

With the 4I/4O module for printed circuit board mounting it is possible for up to four mechanical contacts or 3-wire sensors according to IEC 947-5-2 to be connected or indicator lights to be operated, the power for the short-circuit resistant solid-state switching outputs being provided from an auxiliary voltage (24 V PELV).

Mounting is very easy using a "Card Edge Board-to-Board-Connector". This connector can be ordered for vertical and horizontal mounting from the company AMP, for example:

- 180° version for vertical mounting (AMP): Order number 530843-2
- 90° version for horizontal mounting (AMP): Order number 650118-1

If the inputs are loaded with more than 200 mA, the module does not respond to invoking by a master.

3RK1 200-0CD00-0AA2
AS-Interface communications module for printed circuit board installation

Connection	Connection pad[1)]
ASi+	27, 29
ASi-	28, 30
Sensor+	17, 18, 23, 24
Sensor-	13, 14, 19, 20
IN1	21
IN2	22
IN3	15
IN4	16
Not assigned	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 25, 26

1) Note: Pad numbering, see section *Dimensional Drawings* in the LV1 T "Technical Information".

With the 4I module for printed circuit board mounting it is possible for up to four mechanical contacts or 3-wire sensors to be connected, the power for inputs being provided from AS-Interface cable.

Mounting is very easy using a "Card Edge Board-to-Board-Connector". This connector can be ordered for vertical and horizontal mounting from the company AMP, for example:

- 180° version for vertical mounting (AMP): Order No. 530843-2
- 90° version for horizontal mounting (AMP): Order No. 650118-1

If the inputs are loaded with more than 200 mA, the module does not respond to invoking by a master.

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 400-0CD00-0AA3	**4 inputs / 4 outputs**							
	• Supply of I/Os using AS-Interface cable (max. 200 mA) Printed circuit board with solder pins, protected by enclosure	►	**3RK1 400-0CD00-0AA3**		1	1 unit	121	0.042
	• Supply of I/Os using external auxiliary voltage (24 V PELV)							
	- Printed circuit board with solder pins, protected by enclosure	D	**3RK1 400-0CD01-0AA3**		1	1 unit	121	0.040
	- Printed circuit board with solder pins for horizontal mounting	C	**3RG9 005-0SA00**		1	1 unit	121	0.025
3RG9 005-0SA00	• Supply of outputs using external auxiliary voltage (24 V PELV) Printed circuit board with gold-plated direct connector for 30-pole male connector socket for simple installation with direct connector	B	**3RK1 400-1CD00-0AA2**		1	1 unit	121	0.028
	4 inputs	C	**3RK1 200-0CD00-0AA2**		1	1 unit	121	0.025
	• Printed circuit board with gold-plated direct connector for 30-pole male connector socket							
	• For simple installation with direct connector							

*** You can order this quantity or a multiple thereof.**

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Overview

This module is used to send hexadecimally coded count values (LSB=D0, MSB=D3) to a higher level controller. The count value is increased by one for each valid count pulse at terminal 8. Beginning at 0, the module counts up to 15 and then begins again at 0. The controller adopts the current value and determines the number of pulses between two host invocations through subtraction from the previous value. The total number of count pulses is determined by adding these differences.

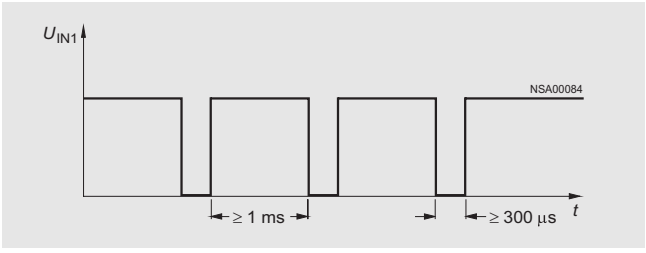
For the values sent to be unambiguous, no more than 15 count values are allowed between two host invocations or AS-Interface master invocations at terminal 8. The maximum permissible transmission frequency is calculated from these times:

$f_{TRmax} = 15 / T_{max}$

T_{max} : maximum possible transmission time from the slave to the host

Another condition for the maximum frequency is the pulse shaped required. For the counter to accept a pulse as valid, a Low must have been applied at the input for at least 300 µs and a High for at least 1 ms. This results in a controller-independent maximum frequency of

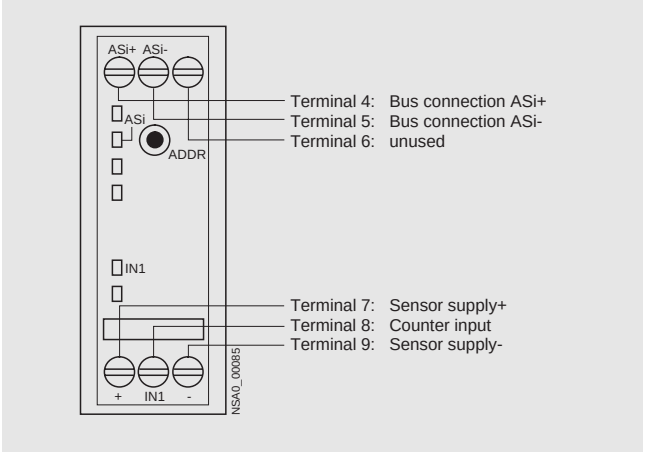
$f_{Cmax} = 1 / 1.3$ ms = 769 Hz for the counter module (see following graphic).



If the time criterion stipulated in the graphic is violated, the count value is rejected.

The counter is active only for the reset parameter P2 (default). The counter is deleted when P2 is set, and the incoming count pulses are not registered until after P2 is reset again.

Note: A customized function block is necessary or must be programmed.



Connection options

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	Counter modules							
3RK1 200-0CE03-0AA2	• With screw terminal connection	A	**3RK1 200-0CE03-0AA2**		1	1 unit	121	0.104
3RK1 200-0CG03-0AA2	• With spring-loaded terminal connection	B	**3RK1 200-0CG03-0AA2**		1	1 unit	121	0.091

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Modules with special functions
Ground-fault detection modules

Overview

"... Ground faults in control circuits must not result in a machine's unintentional starting or hazardous movements, nor must they prevent it from stopping (EN 60204, Part 1 or DIN VDE 0113)."

The AS-Interface ground detection module is used to meet these requirements. Using this module from the SlimLine series, ground faults in AS-Interface systems can be reliably detected and reported.

The following ground faults are detected:

- Ground fault from AS-i "+"
- Ground fault from AS-i "-"
- Ground fault from sensors and actuators which are supplied from the AS-Interface voltage.

One module per AS-Interface network is required.

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Ground-fault detection modules							
• With screw terminal connection	▶	**3RK1 408-8KE00-0AA2**		1	1 unit	121	0.142
• With spring-loaded terminal connection	▶	**3RK1 408-8KG00-0AA2**		1	1 unit	121	0.117

3RK1 408-8KE00-0AA2

Modules with special functions
Overvoltage protection modules

Overview

The AS-Interface overvoltage protection module protects downstream AS-Interface devices or individual sections in AS-Interface networks from conducted overvoltages which can be caused by switching operations and remote lightning strikes.

The location of the overvoltage protection module forms within the lightning protection zone concept the transition from zone 1 to 2/3. Direct lightning strikes must be coped with using additional protective measures at the transitions from lightning protection zone 0A to 1.

With the AS-Interface overvoltage protection module it is now also possible to integrate AS-Interface in the overall lightning protection concept of a plant or machine.

The module has the same design, connection and degree of protection (IP67) as the AS-Interface user modules. It is a passive module without AS-i IC and as such does not need its own address on the AS-Interface network.

Connection to an AS-Interface system is effected through the FK-E or PG-E coupling module. Through use of the EEMS interface, the AS-Interface cable and the auxiliary voltage cable can be protected from overvoltage.

Overvoltages are discharged through a ground cable with a green/yellow oil-proof outer sheath. This cable is fixed in the module and must be connected with low resistance to the system's ground.

Rated discharge current I_{sn}

The rated discharge current is the peak value of a surge current with waveform 8/20 microseconds, for which the overvoltage protection module is rated according to a specific test program.

With waveform 8/20, 100 % of the value is achieved after 8 microseconds and 50 % after 20 microseconds.

Protection level U_p

The protection level of an overvoltage protection module is the highest momentary value of the voltage at the terminals, established in individual tests.

The protection level characterizes the capability of an overvoltage protection module to limit overvoltages to a residual level.

Accessories

An FK-E or PG-E coupling module is required for connection of the AS-Interface cable and the auxliary power supply cable.

*** You can order this quantity or a multiple thereof.**

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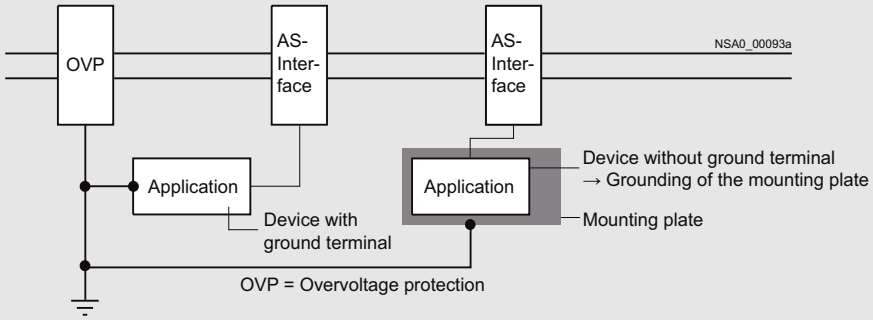
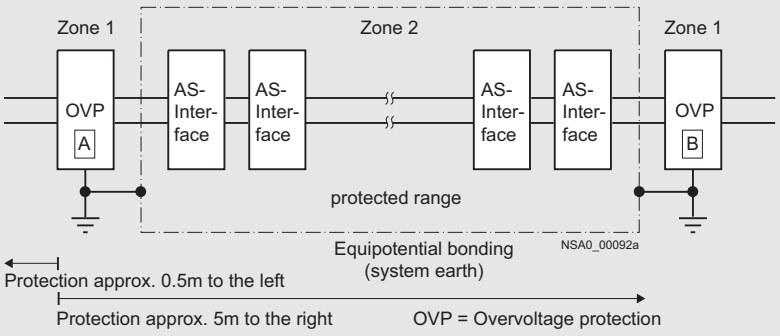
Configuration guidelines



Configuration guidelines for overvoltage protection modules

The grounding of protection modules and the units to be protected must be effected through a shared grounding point (equipotential bonding). If insulated devices are protected, their mounts must be included in the grounding points.

Sample application



Sample application for overvoltage protection modules

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 901-1GA00	**Overvoltage protection modules**	B	**3RK1 901-1GA00**		1	1 unit	121	0.146

*** You can order this quantity or a multiple thereof.**

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AS-Interface connections for LOGO!

Overview

Every LOGO! can now be connected to the AS-Interface system

Using the AS-Interface connection for LOGO!, an intelligent slave can be integrated in the AS-Interface system. With the modular interface it becomes possible to integrate the different basic units in the system according to their functionality. Similarly, functionalities can be quickly and easily adapted to new requirements by exchanging the basic unit.

The interface module provides four inputs and four outputs on the system. These I/Os do not actually exist in hardware terms, however, but are only virtually present through the interface on the bus.

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 400-0CE10-0AA2	**AS-Interface connections for LOGO!** • Four virtual inputs • Four virtual outputs	A	**3RK1 400-0CE10-0AA2**		1	1 unit	121	0.107

* You can order this quantity or a multiple thereof.

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Overview

AS-Interface power supplies are an essential and functionally important part of an AS-Interface network. They supply the electronics of the network (AS-Interface modules and AS-Interface masters) and the connected sensor technology. Furthermore, the integrated data decoupling of AS-Interface power supplies ensures the separation of data and energy, thus enabling AS-Interface to transmit data and power on a single cable.

Benefits

- Compact dimensions save space in control cabinets or in the field
- Higher output rating enables connection of even more AS-Interface nodes
- Integrated ground-fault and overload detection ensure that applications are more reliable and save the need for additional components
- Diagnostics memory, remote indication and remote reset allow fast detection of faults in the system, thus reducing downtimes
- Fast and stable installation of devices thanks to spring-loaded connections
- Removable terminal blocks allow fast component replacement, thus reducing downtimes
- The ultra-wide input range of the 8 A version permits single-phase and 2-phase operation - so no need for connection of a neutral conductor
- UL/CSA approval means the power supply units can be used worldwide

Application

AS-Interface power supplies are always used in conjunction with AS-Interface networks.

Selection and ordering data

Version		DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
AS-Interface power supplies, IP20 • Single output IP20 • With integrated ground-fault detection								
Output current	Input voltage							
3 A	115 / 230 V AC (selectable)	►	**3RX9 501–0BA00**		1	1 unit	121	2.378
3 A	24 V DC	►	**3RX9 501–1BA00**		1	1 unit	121	2.378
5 A	115 / 230 V AC (selectable)	►	**3RX9 502–0BA00**		1	1 unit	121	2.378
8 A	115 / 230 ... 500 V AC (selectable)	►	**3RX9 503–0BA00**		1	1 unit	121	2.378

3RX9 501–0BA00

3RX9 502–0BA00

3RX9 503–0BA00

Conversion table for previous devices:
See section *More Information*.

*** You can order this quantity or a multiple thereof.**

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AS-Interface power supplies, IP20

More information

Conversion table

Previous type		New type		
Order No.	**Version**	**Number**	**Order No.**	**Version**
3RX9 307-0AA00	Single output IP20 2.4 A	1	**3RX9 501-0BA00**	Single output IP20 with ground fault detection 3 A
3RX9 310-0AA00	Single output IP20 with ground fault detection 2.4 A	1	**3RX9 501-0BA00**	Single output IP20 with ground fault detection 3 A
3RX9 307-1AA00	Single output IP20 4 A	1	**3RX9 502-0BA00**	Single output IP20 with ground fault detection 5 A
6EP1 354-1AL01	Single output IP20 7 A	1	**3RX9 503-0BA00**	Single output IP20 with ground fault detection 8 A
3RX9 305-1AA00	Dual output IP20 4 A / 4 A	2	**3RX9 502-0BA00**	Single output IP20 with ground fault detection 5 A
3RX9 306-1AA00	Combi output IP20 4 A (ASi) / 5 A (24 V)	1	**3RX9 502-0BA00**	Single output IP20 with ground fault detection 5 A
		1	**6EP1 333-2AA01**	SITOP 24 V IP20 5 A

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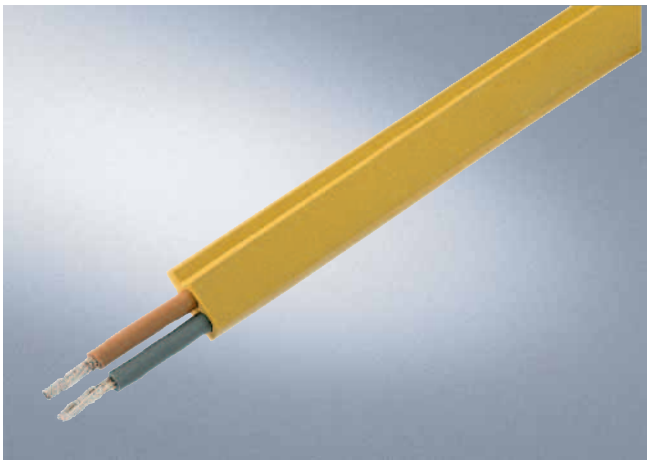
Overview



The actuator-sensor interface - the networking system used for the lowest field area - is characterized by very easy mounting and installation. A new connection method was developed specially for AS-Interface.

The stations are connected using the AS-Interface cable. This two-wire cable has a trapezoidal shape, thus ruling out polarity reversal.

Connection is effected by the insulation piercing method. In other words, male contacts pierce the shaped AS-Interface cable and make reliable contact with the two wires. Cutting to length and stripping are superfluous. Consequently, AS-Interface stations (e.g. I/O modules, intelligent devices) can be connected in the shortest possible time and exchanging devices is quick.

To enable use in the most varied ambient conditions (e.g. in an oily environment), the AS-Interface cable is available in different materials (rubber, TPE, PUR).

For special applications it is also possible to use a standard round cable. With AS-Interface, data and power for the sensors (e.g. BERO proximity switches) and actuators (e.g. indicator lights) are transmitted over the yellow AS-Interface cable.

The black cable must be used for actuators with a 24 V DC supply (e.g. solenoid valves) and a high power requirement.

Selection and ordering data

Version			DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
AS-Interface shaped cables									
Material	Color	Quantity							
Rubber	Yellow (AS-Interface)	100-m roll	►	**3RX9 010-0AA00**		1	1 unit	121	7.148
	Yellow (AS-Interface)	1-km drum	B	**3RX9 012-0AA00**		1	1 unit	121	80.000
	Black (24 V DC)	100-m roll	►	**3RX9 020-0AA00**		1	1 unit	121	7.092
	Black (24 V DC)	1-km drum	B	**3RX9 022-0AA00**		1	1 unit	121	80.000
TPE	Yellow (AS-Interface)	100-m roll	►	**3RX9 013-0AA00**		1	1 unit	121	6.627
	Yellow (AS-Interface)	1-km drum	B	**3RX9 014-0AA00**		1	1 unit	121	78.000
	Black (24 V DC)	100-m roll	►	**3RX9 023-0AA00**		1	1 unit	121	6.459
	Black (24 V DC)	1-km drum	B	**3RX9 024-0AA00**		1	1 unit	121	69.666
TPE special version acc. to UL Class 2	Yellow (AS-Interface)	100-m roll	C	**3RX9 017-0AA00**		1	1 unit	121	6.900
	Black (24 V DC)	100-m roll	C	**3RX9 027-0AA00**		1	1 unit	121	6.984
PUR[1)]	Yellow (AS-Interface)	100-m roll	►	**3RX9 015-0AA00**		1	1 unit	121	6.131
	Yellow (AS-Interface)	1-km drum	B	**3RX9 016-0AA00**		1	1 unit	121	69.100
	Black (24 V DC)	100-m roll	►	**3RX9 025-0AA00**		1	1 unit	121	6.323
	Black (24 V DC)	1-km drum	B	**3RX9 026-0AA00**		1	1 unit	121	200.000

[1)] Note on towability of the AS-Interface cable with PUR outer sheath: To determine its towability, the AS-Interface cable was tested in "IGUS tow chains" Type 10.2.048 and 20.2.55. For the test, the tow chain was fitted with 3 × AS-Interface cables and diverse round cables. After three million bendings (stroke), no damage to the cores, strands or outer sheath were discovered (tow chain equipped to 50 %).

*** You can order this quantity or a multiple thereof.**

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Extension plug

Overview

With the extension plug / extension plug plus it is possible to double the cable length possible in an AS-Interface segment from 100 to 200 m.

The extension plug / extension plug plus is a passive component which is connected to that point of the AS-Interface network that is furthest away from the power supply. It has an M12 connector for quick connection to the AS-Interface M12 feeder with degree of protection IP67.

Only one power supply unit is needed to supply power to the slaves on the up to 200 m long segment.

The extension plug / extension plug plus has integrated undervoltage detection for monitoring the AS-Interface voltage in order to be sure that the necessary voltage still exists at the end of the bus cable. Undervoltage is signaled on the extension plug by means of a diagnostics LED. The extension plug plus is equipped with an AS-Interface slave and communicates this diagnostics information directly to the AS-Interface master.

Benefits

- Doubling of the cable length from 100 to 200 m per AS-Interface segment
- More possibilities of use and greater freedom for plant planning through doubling of the AS-Interface segment
- Notable reduction of network infrastructure costs for large networks
- Enables in combination with repeaters a maximum range of up to 600 m for AS-Interface networks (for details see section *Configuration* in the LV1 T "Technical Information")
- Easy monitoring through integrated undervoltage detection

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 901-1MX00	**AS-Interface extension plugs**[1] • Doubling of the cable length to 200 m per AS-Interface segment • Undervoltage monitoring signal by means of diagnostics LED	►	**3RK1 901-1MX00**		1	1 unit	121	0.035
	AS-Interface extension plugs plus[1] • Doubling of the cable length to 200 m per AS-Interface segment • Undervoltage monitoring signal by means of integral AS-Interface slave to AS-Interface master	►	**3RK1 901-1MX01**		1	1 unit	121	0.035
Accessories								
3RX9 801-0AA00	**AS-Interface M12 feeders** • For adaptation of shaped AS-Interface cable to a standard round cable • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable • Degree of protection IP67	►	**3RX9 801-0AA00**		1	1 unit	121	0.029

[1] For connection to the AS-Interface flat cable you need the AS-Interface M12 feeder, which must be ordered separately (see section *Accessories*).

*** You can order this quantity or a multiple thereof.**

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Overview

To be able to participate in data exchange with the master, all stations have to be addressed before the AS-Interface network is configured. This can be done

- offline by means of an addressing unit or
- online using the master of the AS-Interface system.

The addresses themselves are the values 1 to 31 (or 1A to 31A and 1B to 31B for the extended AS-Interface Specification 2.1). A new slave that has not yet been addressed has the address 0. It is recognized accordingly by the master as a new slave that has not yet been addressed and as such is not yet included in the normal communication.

The address can be assigned at random, i.e. it makes no difference whatsoever if the slave with address 21 begins or if the first slave is actually issued with address 1.

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 904-2AB01	**AS-Interface addressing units** • For active AS-Interface modules, intelligent sensors and actuators • According to AS-Interface Version 2.1 • Including expanded addressing mode • Scope of supply: - One addressing unit - One operating manual (German, English, French, Spanish, Italian) - One addressing cable (1.5 m, with jack plug)	►	**3RK1 904-2AB01**		1	1 unit	121	0.540
Accessories								
	FK-E coupling modules, with integrated addressing socket[1] for addressing user modules	A	**3RK1 901-1MA00**		1	1 unit	121	0.057
	Addressing cables, with M12 socket[1] • For addressing[2] slaves with M12 connection (e.g. K60R) or light curtains • 1.5 m	A	**3RX8 000-0GF32-1AB5**		1	1 unit	574	0.069
	Addressing cables, with jack plug[3] • 1.5 m • Included in scope of supply of of the 3RK1 904-2AB01 addressing unit		**Z236A**					

1) Not included in scope of supply of of the 3RK1 904-2AB01 addressing unit

2) Note: A 3-pole cable must be used because the addressing unit uses PIN 2, 4 and 5 for IR addressing.

3) Can be ordered only from the following address:
Gossen-Metrawatt GmbH, Thomas-Mann-Str. 16-20,
90471 Nürnberg, Germany
Tel.: +49 (0)911/8602-111, Fax: +49 (0)911/8602-777,
E-Mail: info@gmc-instruments.com

*** You can order this quantity or a multiple thereof.**

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AS-Interface analyzers

Overview

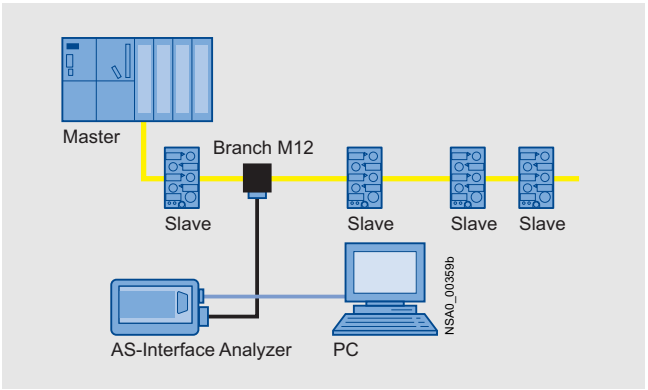
The AS-Interface analyzer is used to test AS-Interface networks. It enables systematic troubleshooting and permanent monitoring.

Installation errors, e.g. loose contacts or EMC interference under extreme loads, can be revealed by this device.

Thanks to the easy-to-use software the user can assess the quality of complete networks even if he lacks detailed specialist knowledge of AS-Interface. In addition it is an easy matter with the AS-Interface analyzer to create test logs from the records produced, thus providing documentation for start-ups and service assignments.

For advanced AS-Interface users there are trigger functions for detailed diagnostics.

Connection



The AS-Interface analyzer follows the communication on the AS-Interface network as a passive station. The unit is supplied simultaneously from the AS-Interface cable.

This analyzer interprets the physical signals on the AS-Interface network and records the communication.

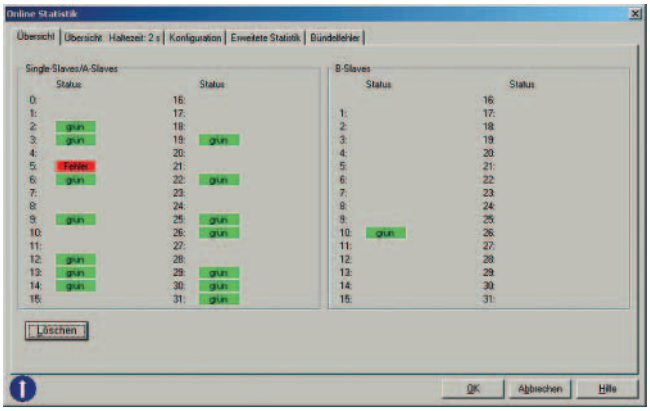
The data thus obtained are transferred through an RS 232 interface to a PC such as a notebook, for evaluation with the supplied diagnostics software.

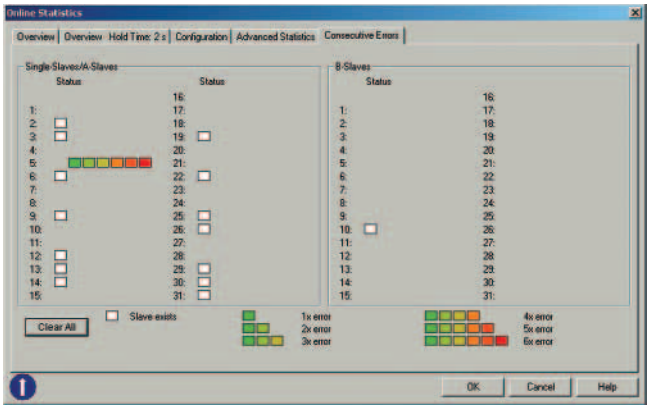
Benefits

- Simple and user-friendly operation enables diagnostics of AS-Interface networks without help from specialists
- Speedy troubleshooting thanks to intuitive display in statistics mode
- Test logs provide verification of the state and quality of the installation for service and approval
- Recorded logs facilitate remote diagnostics by Technical Assistance
- Comprehensive trigger functions enable exact analysis
- Process data can be monitored online

Application

Online statistics





This mode provides a quick overview of the existing AS-Interface system. The error rates are presented per slave in a traffic-light function (green, yellow, red).

The bus configuration and the currently transmitted data of the slaves are shown in a well arranged presentation.

With the expanded statistics function it is possible to determine the error rates as the number of transmitted or faulty bus message frames.

The bundle error overview shows in steps how many multiple repetitions of message frames occurred in order to enable a selective and look-ahead assessment of the transmission quality.

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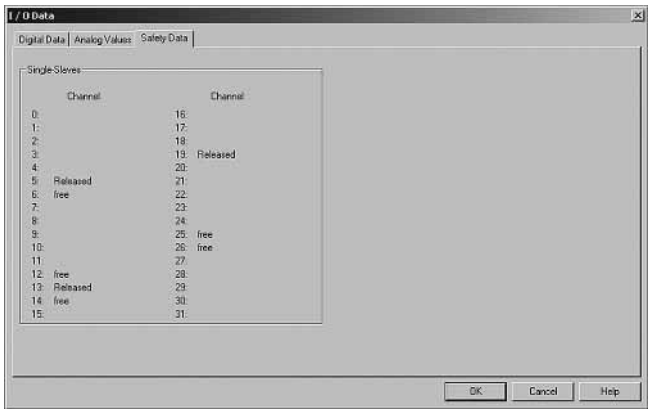
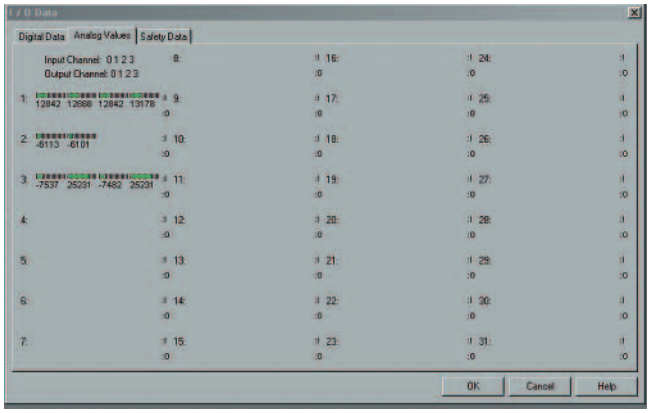
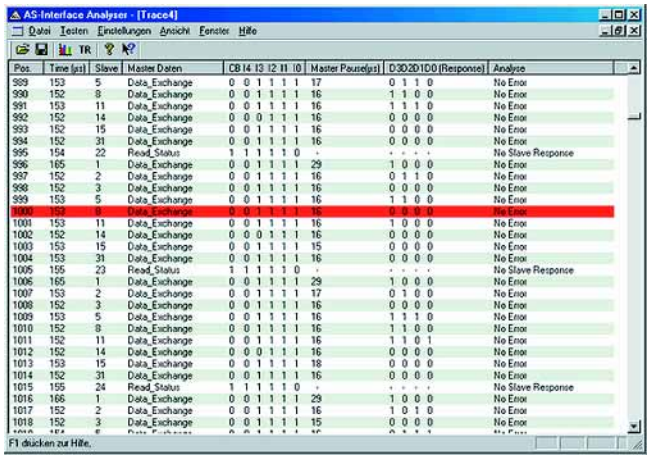
Data mode





In this mode the analyzer now shows not only the digital input/output values but also the current analog values and the input status of the safety slaves.

Trace mode


AS-Interface Analyzer - [Trace4]
Datei Testen Einstellungen Ansicht Fenster Hilfe
Pos. | Time [µs] | Slave | Master Daten | CB I4 I3 I2 I1 I0 | Master Pause[µs] | D3D2D1D0 (Response) | Analyse
F1 drücken zur Hilfe.

The presentation of message frames in the style of a classic field bus analyzer is indispensable for complex troubleshooting. Extensive trigger functions and recording and viewing filters are available for this purpose.

An external trigger input and trigger output round off the scope of functions in order to find even the most difficult errors.

For troubleshooting in connection with safety monitor applications, changes of status in the code tables of safety slaves are identified and assessed.

Test log

The recorded data of the online statistics are easy to output and document using a test log. Verification of the state of the plant can thus be provided for approvals or service assignments.

The new measurement assistant records the bus signals for an adjustable period, automating the creation of the test log. A standardized quality test of AS-i plants is thus possible.

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AS-Interface analyzers

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 904-3AB01	**AS-Interface analyzers** • For testing actuator/sensor interface systems • For service assignments in installations and networks with AS-Interface systems • Scope of supply: - AS-Interface analyzers - RS 232 cable for connecting to PC - Diagnostics software (CD-ROM) for PC (Windows 95/98, ME, 2000, NT, XP)	►	**3RK1 904-3AB01**		1	1 unit	121	0.450
Accessories								
3RX9 801-0AA00	**AS-Interface M12 feeders** • For adaptation of shaped AS-Interface cable to a standard round cable • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable • Degree of protection IP67	►	**3RX9 801-0AA00**		1	1 unit	121	0.029
	M12 cable plugs • Cable: PUR • Length: 5 m • Color: Black	A	**3RX8 000-0CD42-1AF0**		1	1 unit	574	0.176

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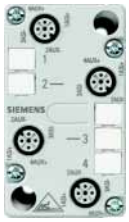
Selection and ordering data

	Version				DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 901-1NN00	**AS-Interface standard distributors, for AS-Interface flat cables** • Current carrying capacity up to 7 A • Delivery includes special mounting plate for wall and standard rail mounting • Seals (3RK1 902-0AR00) are required only if a cable is to be terminated in the distributor and must be ordered separately				►	**3RK1 901-1NN00**		1	1 unit	121	0.086
3RK1 901-1NN10	**AS-Interface compact distributors, for AS-Interface flat cables** Current carrying capacity up to 6 A				A	**3RK1 901-1NN10**		1	1 unit	121	0.040
3RX9 801-0AA00	**AS-Interface M12 feeders**										
	for flat cable	for	Cable length	Cable end in feeder							
	AS-i	M12 socket	--	available	►	**3RX9 801-0AA00**		1	1 unit	121	0.029
3RK1 901-1NR10	**AS-Interface M12 feeders**										
	for flat cable	for	Cable length	Cable end in feeder							
	AS-i	M12 socket	--	not available	A	**3RK1 901-1NR10**		1	1 unit	121	0.060
3RK1 901-1NR11	AS-i	M12 cable box	1 m	not available	A	**3RK1 901-1NR11**		1	1 unit	121	0.070
	AS-i	M12 cable box	2 m	not available	A	**3RK1 901-1NR12**		1	1 unit	121	0.100
	AS-i / U_{aux}	M12 socket	--	not available	A	**3RK1 901-1NR20**		1	1 unit	121	0.060
	AS-i / U_{aux}	M12 cable box	1 m	not available	A	**3RK1 901-1NR21**		1	1 unit	121	0.070
	AS-i / U_{aux}	M12 cable box	2 m	not available	A	**3RK1 901-1NR22**		1	1 unit	121	0.100
 3RK1 901-1NR00	**AS-Interface quadruple M12 feeders**										
	for flat cable	for	Cable length	Cable end in feeder							
	AS-i / U_{aux}	Quadruple M12 socket Supplied with coupling module	--	available	A	**3RK1 901-1NR00**		1	1 unit	121	0.186
3RK1 901-1TR00	**M12-T distributors** • IP68 • 1 x M12 connector • 2 x M12 box				C	**3RK1 901-1TR00**		1	1 unit	121	0.038
6ES7 194-1KA01-0XA0	**M12 Y-shaped coupler plugs** for connection of two sensors to one M12 socket with Y connector				►	**6ES7 194-1KA01-0XA0**		1	1 unit	250	0.046
3RK1 901-3RA00	**Addressing cables, with jack plug, to M12** • For addressing slaves with M12 bus connection • Only required for 3RK1 904-2AB00 addressing unit • If the latest version of the 3RK1 904-2AB01 addressing unit is being used, addressing is executed over the standard 3RX8 000-0GF32-1AB5 M12 cable				C	**3RK1 901-3RA00**		1	1 unit	121	0.064

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Miscellaneous accessories

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
3RK1 901-1KA00	**AS-Interface sealing caps M12** for free M12 sockets	►	**3RK1 901-1KA00**		100	10 units	121	0.100
3RK1 901-1KA01	**AS-Interface sealing caps M12, tamper-proof** for free M12 sockets	A	**3RK1 901-1KA01**		100	10 units	121	0.100
3RK1 901-1PN00	**AS-Interface sealing caps M8** for free M8 sockets	A	**3RK1 901-1PN00**		100	10 units	121	0.100
3RK1 901-1MD00	**AS-Interface seals M20** • For AS-Interface cable, shaped • For insertion in M20 glands	A	**3RK1 901-1MD00**		100	10 units	121	0.100
3RK1 901-3QM00	**Cable adapters for flat cables** Connection of AS-Interface cable to metric gland with insulation piercing method • Continuation using standard cable - For M16 gland - For M20 gland • Continuation using pins - For M16 gland - For M20 gland	 B B B B	 **3RK1 901-3QM00** **3RK1 901-3QM10** **3RK1 901-3QM01** **3RK1 901-3QM11**		 1 1 1 1	 1 unit 1 unit 1 unit 1 unit	 121 121 121 121	 0.015 0.017 0.015 0.015
3RK1 901-3QA00	**Cable clips for cable adapters**	►	**3RK1 901-3QA00**		100	10 units	121	0.100
3RK1 901-1MN00	**Cable terminating pieces** for sealing of open cable ends (shaped AS-Interface cable) in IP67	►	**3RK1 901-1MN00**		1	10 units	121	0.085
3RK1 901-2EA00	**K45 mounting plates** • For wall mounting • For standard rail mounting	 ► ►	 **3RK1 901-2EA00** **3RK1 901-2DA00**		 1 1	 1 unit 1 unit	 121 121	 0.027 0.036
3RK1 901-0CA00	**K60 mounting plates** suitable for all K60 compact modules • For wall mounting • For standard rail mounting	 ► ►	 **3RK1 901-0CA00** **3RK1 901-0CB01**		 1 1	 1 unit 1 unit	 121 121	 0.065 0.095
3RK1 902-0AR00	**Sealing sets** • For mounting plate K60 and standard distributor • Cannot be used for mounting plate K45 • One set contains one straight and one shaped seal	B	**3RK1 902-0AR00**		100	5 sets	121	0.100

Other accessories:

- See Catalog FS 10 / chapter *Proximity Switches* / section *Accessories* / *Plug-in Connectors*
- See A&D-Mall / section *Sensors, Measurement and Testing Systems* / *Proximity Switches* / *Accessories* / *Plug Connectors*

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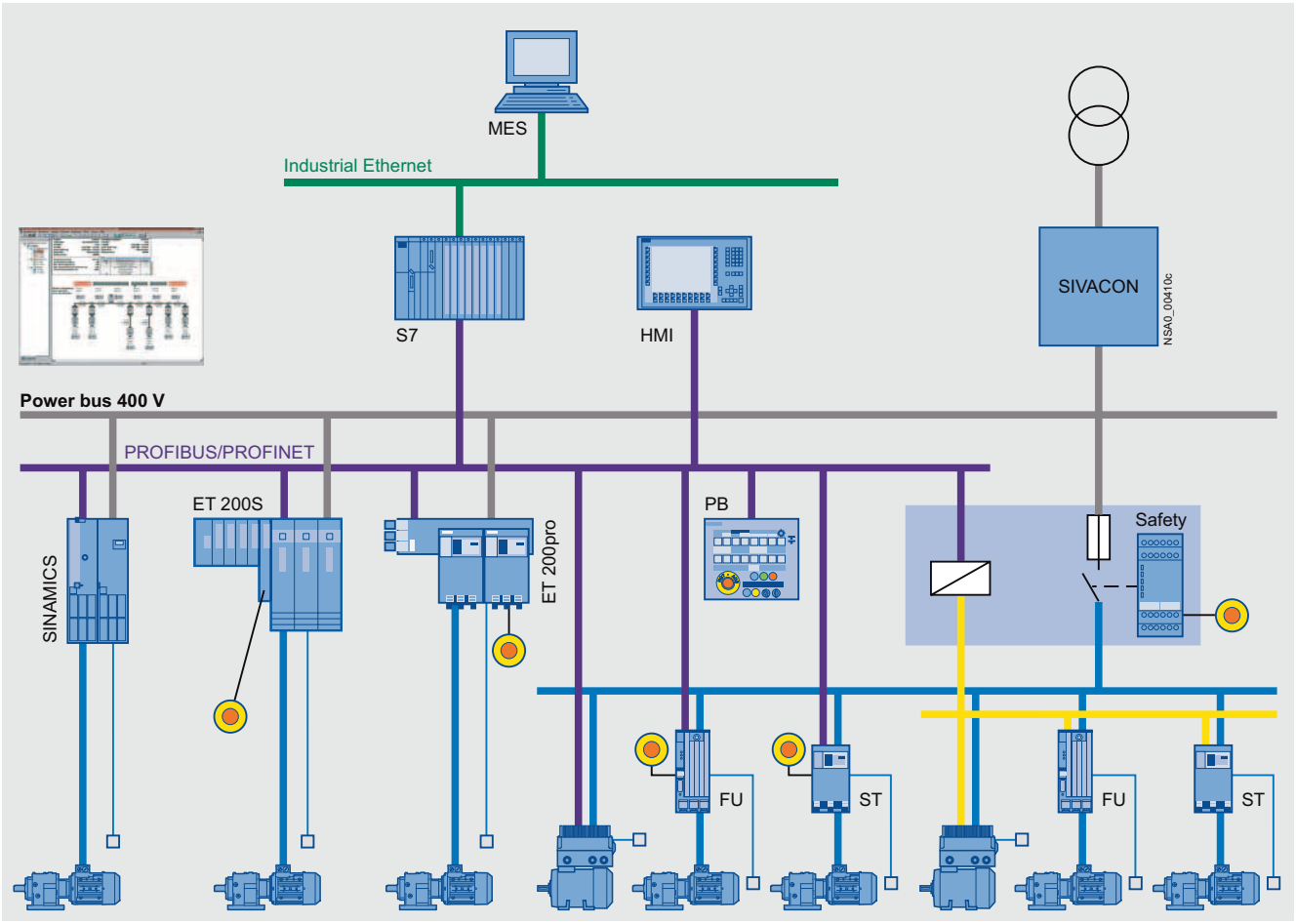
Overview



SIRIUS motor starter applications is a system solution for the flexible and uniform decentralization of drive technology in the field. It is centered on the extensive decentralization and modularization of fusing, switching and control elements and safety technology, combined with comprehensive diagnostics down to the component level.

Modern field and power bus technologies open up new possibilities for machinery and plant engineering. Systems of distributed design are flexible and can be adapted to the various requirements of industrial automation.

An extensive range of geared and near-motor sensors plus a large assortment of motor starters and frequency converters ensure optimum operation of the motors.

Motor starters and frequency converters are available in various versions. Compact drive trains with a high degree of protection (IP65) or modular island solutions with low or medium degree of protection (IP20 or IP65) can be implemented depending on the type of plant.

Communication with the higher control level is provided by standardized fieldbus systems (PROFIBUS/PROFINET, AS-Interface), which are used to exchange not only control information but also parameter and diagnostics data.

Full integration in TIA is realized with PROFIBUS/PROFINET.

Safety technology is also an integral component. On the device level as well as on a higher level it with PROFIsafe, our concepts and matching products ensure the safe operation of your plant.

The SIVACON power bar distribution system and our ECOFAST power bus system see to the supply and distribution of energy from the low-voltage transformer to the field device.

Benefits

- Modular construction
- Flexible expansion
- Graded range of motor starters and frequency converters
- Diagnostics capability
- Communication using standardized field bus systems
- Standardized connection method
- Energy supply and distribution to the field device

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System overview

Application

SIMATIC ET 200S: The flexible and modular system with degree of protection IP20

The SIMATIC ET 200S system for PROFIBUS DP and PROFINET offers a range of I/O modules (digital and analog), motor starters (mechanical and solid-state) and frequency converters. The SIMATIC ET 200S is suitable for central use in cabinets as well as for distributed use in local control cabinets.

The advantages for the customer are:

- Creation of an optimum "package" of automation islands
- Customized implementation of random additional functions in the control box/cabinet

For the for ET 200S there is also an extensive range of safety-oriented components available for implementing both local and distributed solutions using PROFIsafe.

When installed in high-grade steel cases this solution is also suitable for use in the food and beverage sector.

SIMATIC ET 200pro: The flexible and modular system with degree of protection IP65

The SIMATIC ET 200pro is a modular I/O station with a high degree of protection for PROFIBUS DP and PROFINET. Several expansion modules can be connected to the respective basic module. The function-oriented construction of stations is possible using the technology-oriented modules.

The following components are available:

- Digital and analog I/O modules
- Motor starters in various versions
- For the ET 200pro there are also safety-oriented components available for local and distributed solutions with PROFIsafe

ECOFAST: The system solution for cabinet-free automation

ECOFAST (Energy and Communication Field Installation System) is a system solution for decentralization outside the control cabinet. It comprises a wide range of automation, drive and installation components with a high degree of protection. Energy and information are thus distributed and transmitted in a line.

ECOFAST connects all the components of an automation system using a uniform, standardized connection method for data and energy, complying with ISO 23570 specifications. This makes ECOFAST an integral component of Totally Integrated Automation and open for manufacturers and users alike.

The ECOFAST ES configuring tool supports:

- Configuration of the power bus (short-circuiting, selectivity, voltage drop)
- Validity checks of interfaces between the components selected and the documentation
- The documentation

SIRIUS Safety Integrated

With SIRIUS Safety Integrated we offer the matching solution for your drive application. From the economical version with 3TK28 safety combination to the high-end solution with integrated safety technology using PROFIsafe, which can be used in conjunction with a safe control system. The graded safety concept provides maximum flexibility in all safety matters.

SIVACON

Busway systems bring the power flow economically on track. Distributed power distributions and a well arranged network topology make planning and implementation easier. Two-man assembly saves time and money compared to the costly cable installation method. A power distribution system must be adapted to actual requirements. The bar takes you quickly to your goal. Your plant can be rearranged without difficulty – cost-intensive downtimes are greatly minimized.

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More information

	Product	For further information see
	SIMATIC ET 200S	• A&D Mall: Section Automation Systems / SIMATIC Industrial Automation Systems / Distributed Peripherals / ET 200S • Catalog IK PI, Chapter "SIMATIC ET 200 Distributed Peripherals" • Catalog LV 1, Chapter "Load Feeders, Motor Starters and Soft Starters"
	SIMATIC ET 200pro	• A&D Mall, Section Automation Systems / SIMATIC Industrial Automation Systems / Distributed Peripherals / ET 200pro • Catalog IK PI, Chapter "SIMATIC ET 200 Distributed Peripherals" • Catalog LV 1, Chapter "Load Feeders, Motor Starters and Soft Starters"
	ECOFAST	• A&D Mall, Section Low-Voltage Controls / SIRIUS Industrial Controls / Systems / ECOFAST System • Catalog IK PI, Chapter "ECOFAST System"
	SIRIUS Safety Integrated	• A&D Mall, Section Low-Voltage Controls / SIRIUS Industrial Controls / Systems / SIRIUS Safety Integrated
	SIVACON	• A&D Mall, Section Low-Voltage Controls / Low-Voltage Power Distribution / SIVACON Power Distribution Boards, Busway and Cubicle Systems • Catalog LV 1, Chapter "SIVACON Power Distribution Boards, Busway and Cubicle Systems"

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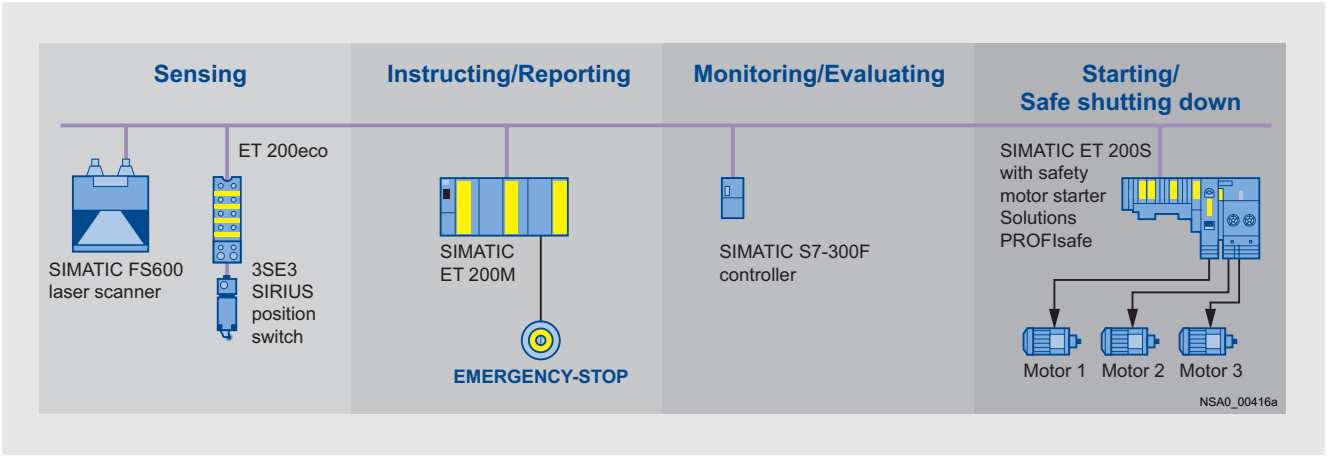
System overview

Overview

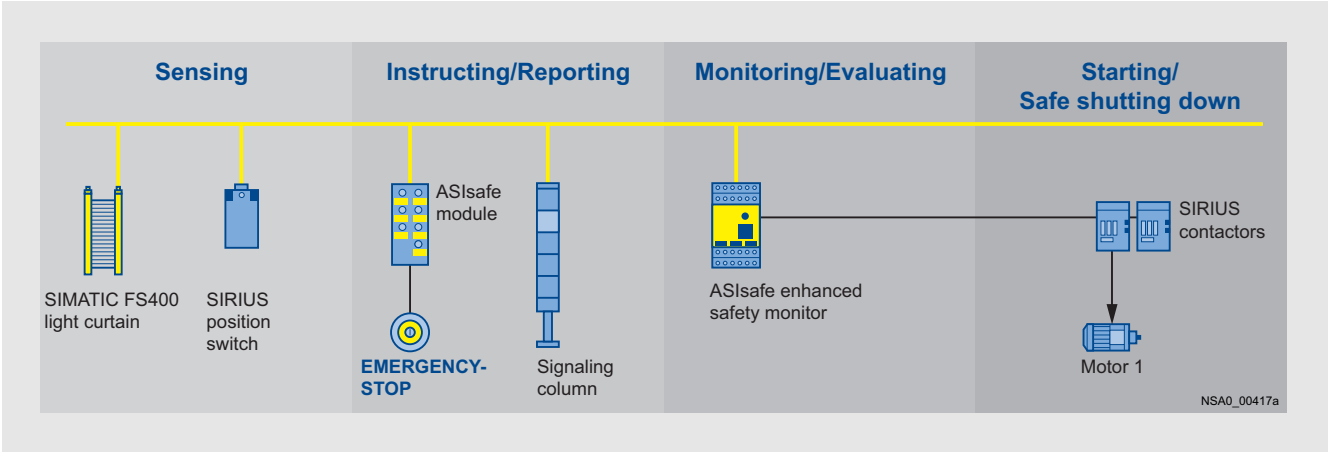
In spite of the steadily increasing complexity in industrial automation, many applications are restricted to specific areas. However simple the requirements may be, it is important to have a reliable partner for these cases too.

With our SIRIUS Safety Integrated controls we offer the optimum concept for your needs. Be it for failsafe sensing, instructing and reporting, monitoring and evaluating or starting and reliable shutting down - our safety integrated controls are expert at performing safety tasks in your plant. SIRIUS Safety Integrated combined with standard fieldbus systems such as AS-Interface and PROFIBUS can solve even networked safety tasks of greater complexity.

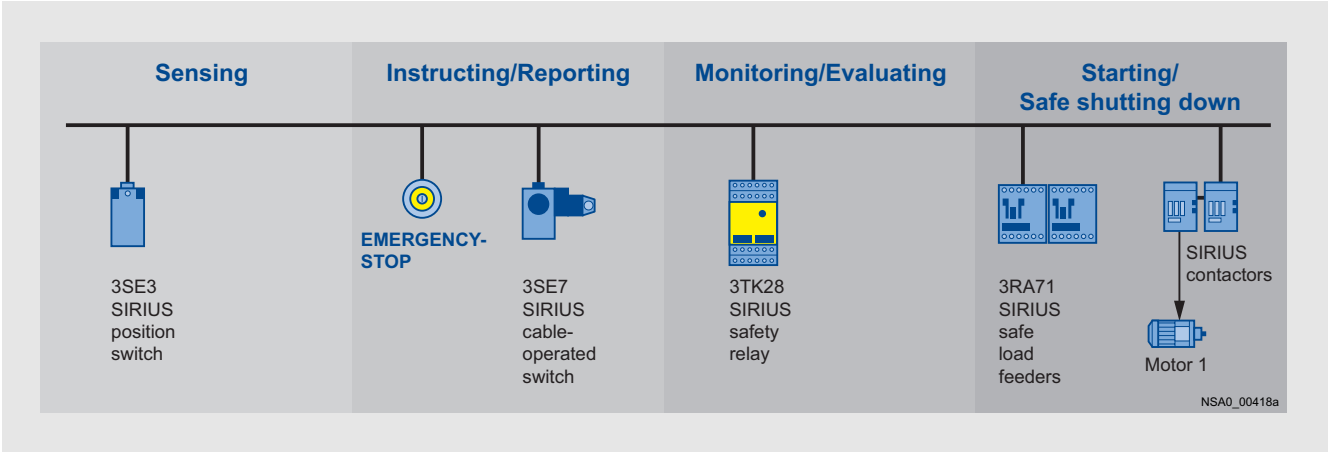
Integration in the the world of Totally Integrated Automation is thus assured.



PROFIsafe: Selective shutting down with PROFIsafe safety motor starters



ASIsafe: Fast start-up and easy configuring of the safety functions



Conventional safety systems: Simple and cost-effective safety solutions

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Benefits

Integration of safety technology in standard automation means less work for you and greater cost effectiveness.

Cost efficiency

- A single system for standard and safety automation reduces the diversity of equipment
- One bus and one engineering system for standard and safety technology cut costs
- Simple reproduciblity for series machines by means of software solution

Productivity

- Shortening of downtimes through fast localization of faults plus comprehensive diagnostics functions
- Speedy restarts after essential plant modifications thanks to flexibility
- Safe, fault-tolerant systems also available for production without stoppages

Standardization

- Uniform user interface for standard and safety technology
- Libraries increase re-usability
- Fewer control cabinet variants on machines
- Simpler installation technology in plants thanks to bus systems

Application

Safe sensing

For the sensing of signals you need devices which you can rely on: SIRIUS detecting devices. In practically every application these mechanical sensors detect movement sequences of all types and pass them on in the form of an electric signal, thus enabling machines or plants to be shut down immediately in the event of a fault. All mechanical position switches can be used for applications up to Cat. 4 according to EN 954-1 and have positively driven contacts according to IEC 60947-5-1. Be it for the monitoring of protective devices or for the sensing of hazardous movements by machine parts - SIRIUS Safety Integrated detects to perfection every wrong movement even under the toughest conditions.

	Position switches without tumbler	**Position switches with tumbler**	**Hinge switches**	**Short-stroke switches**	**Magnet switches**
Description	for the mechanical monitoring of protective devices	for the mechanical monitoring of protective devices and protective door interlocks	for the mechanical monitoring of protective devices	for the mechanical monitoring of protective devices, for positional scanning of linear movements	for the non-contact monitoring of protective doors
Application	Protective door monitoring, position detection of moving machine parts	Protective door monitoring with tumbler	Protective door monitoring	Protective door monitoring	Protective door monitoring
Communication	with direct connection to ASIsafe	with direct connection to ASIsafe	--	--	--
More information	• A&D Mall: section *Low-Voltage Controls / SIRIUS Industrial Controls / Detecting Devices* • Chapter *Detecting Devices*				

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System overview

Safe instructing and reporting

When things become critical, you must be able to intervene quickly and easily in order to bring machines and plants to a safe standstill. For such moments we offer a complete range of reliable commanding and signaling devices. For example, EMERGENCY-STOP control devices for the most diverse applications. Two-hand operation consoles for maximum safety on presses or punches. Effective cable-operated switches which can also be used as EMERGENCY-STOP devices in particularly long and endangered areas. And last but not least signal lamps and integrated signal lamps. By the way: Many of our SIRIUS commanding and signaling devices can communicate through AS-Interface.

	EMERGENCY-STOP	Cable-operated switches	Two-hand operation consoles	Foot switches	Signaling columns / Integrated signal lamps
Description	EMERGENCY-STOP for the failsafe interruption of the safety circuit	Safe shutting down by means of a pull-cable, monitoring of particularly long, endangered areas	Manual, safe initiation of hazardous movements, directing of both hands to one position, simultaneous actuation < 0.5 s	Locking through actuation by foot	Acoustic and visual signaling devices
Application	EMERGENCY-STOP applications in the manufacturing industry	EMERGENCY-STOP applications in the manufacturing industry on long machines and plants	Safety for presses and punches	Safe actuation by foot outside the danger area	Status signaling on machines and plants
Communication	with direct connection to ASIsafe	with direct connection to ASIsafe	with direct connection to ASIsafe	--	AS-Interface connection using adapter element
More information	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Commanding and Signaling Devices* • Catalog: Chapter *Commanding and Signaling Devices*				

Safe monitoring and evaluating

For plants with safety requirements to run smoothly and with high availability they must be monitored. Our 3TK28 safety relays have been doing this, reliably and very cost-effectively, for many decades. The evaluation of safety-oriented data is performed by the centerpiece of ASIsafe: the ASIsafe safety monitor. Evaluation functions are performed likewise by the safety modules for ET 200S motor starters.

	3TK28 safety relays	ASIsafe safety monitors	ET 200S safety modules
Description	Solid-state safety relays with contacts	Centerpiece of the ASIsafe system, for monitoring and evaluating	Modules for the ET 200S safety motor starters, for monitoring and evaluating on presses and punches
Application	Monitoring of Emergency-Stop circuits, protective door monitors, non-contact protective devices, press controllers	Monitoring of Emergency-Stop circuits, protective door monitors, non-contact protective devices	Monitoring of Emergency-Stop circuits and protective door monitors
Communication	--	AS-Interface, gateway to PROFIBUS	PROFIBUS
More information	A&D Mall: - Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters* - Section *Low-Voltage Controls / SIRIUS Industrial Controls / Monitoring and Control Devices* • Catalog: - Chapter *Load Feeders, Motor Starters and Soft Starters* - Chapter *Monitoring and Control Devices*		

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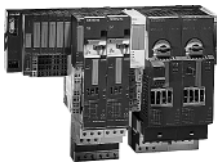
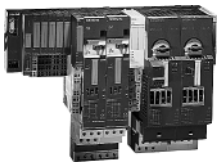
Starting and safe shutting down

The new failsafe motor starters of the SIMATIC ET 200S provide failsafe stopping and shut-down for safety-oriented applications which are realized at control level. They can be used as island solutions directly in the field, for example, or for selective disconnection in PROFIsafe applications. The safe load feeder unites the functions of a motor starter and a safety relay and is responsible for safe shutting down. It thus provides double protection: From overloading and short-circuiting of the motor and from placing operators in danger.

			
	Safety motor starters Solutions local	**Safety motor starters Solutions PROFIsafe**	**Safe load feeders**
Description	Motor starters for starting and safe shutting down with conventional controls	Motor starters for starting and safe shutting down with high safety through integrated self monitoring	Combination of motor starter protector and two series-connected contactors
Application	All safety applications in the manufacturing industry	All safety applications in the manufacturing industry	All safety applications in the manufacturing industry
Communication	PROFIBUS DP and PROFIsafe	PROFIBUS DP and PROFIsafe	--
More information	• A&D Mall: - Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters* - Section *Low-Voltage Controls / SIRIUS Industrial Controls / Monitoring and Control Devices* • Catalog: - Chapter *Load Feeders, Motor Starters and Soft Starters* - Chapter *Monitoring and Control Devices*		

More information

You can find more information on the Internet at:

http://www.siemens.com/safety

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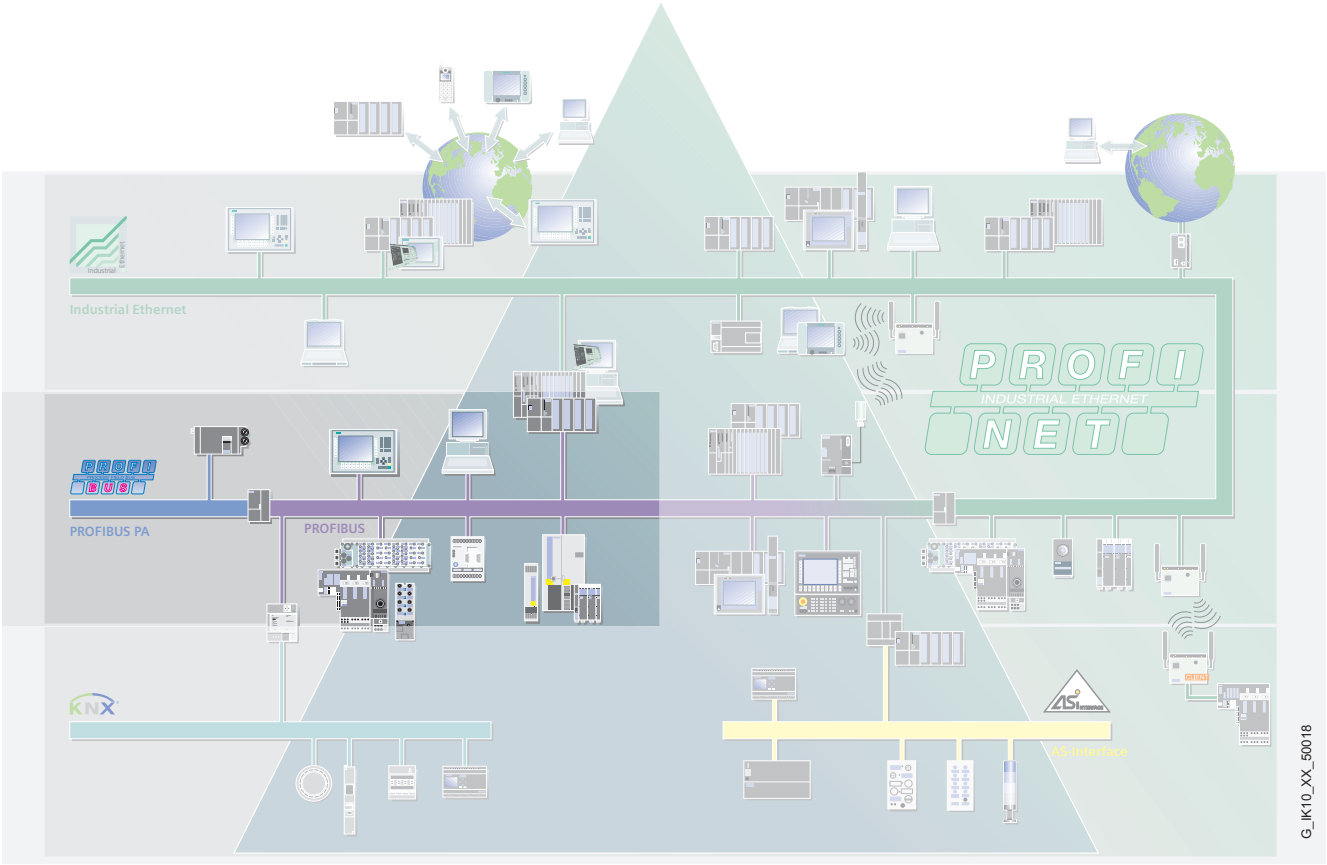
Introduction

Overview

- Bus system
  - For process and field communication in cell networks with few stations and with field devices
  - For data communication according to IEC 61158/EN 50170
- Provides openness for connecting standard-conform components from different manufacturers
  - PROFIBUS – the fieldbus standard in production and process automation comprises:
  - Defining of standards for physical bus characteristics and access control
  - Defining of the user protocol and the user interface
- Process or field communication
  - PROFIBUS DP for fast, cyclic data exchange with field devices
  - PROFIBUS PA for applications in process automation and in the inherently safe area
- Data communication
  - PROFIBUS FMS for data communication between automation devices from different manufacturers



PROFIBUS within the automation pyramid

Benefits

get Designed for Industry

- PROFIBUS is an efficient, open and robust bus system which guarantees smooth communication.
- The system is fully standardized, thus enabling standard-conform components from different manufacturers to be connected without problem.
- Configuring, commissioning and troubleshooting can be performed from any position. This means that the freely selectable communication relationships are very flexible, easy to implement and simple to change
- Fast local assembly and commissioning using the FastConnect cabling system.
- Constant monitoring of the network components by means of a simple and effective signaling concept.
- High protection for your investment because existing systems can be expanded without repercussions.
- High availability thanks to ring redundance with OLM.

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Overview

Communication functions

The process or field communication (PROFIBUS DP, PROFIBUS PA) is used to link field device to an automation, HMI or I&C system.

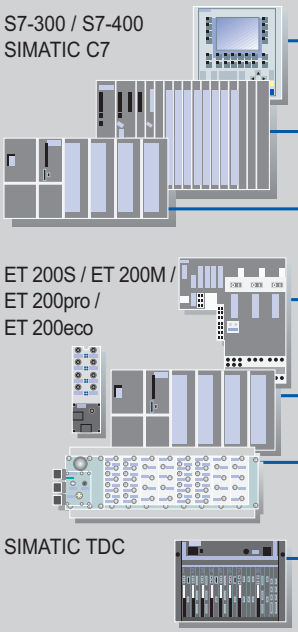
The connection can be established through integrated interfaces on the CPU or using interface modules (IMs) and communications processors (CPs).

With today's powerful automation systems it is often more effective to link several PROFIBUS DP lines to one automation system not only in order to increase the number of connectable I/O stations but also to be able to handle individual production areas independently of others (segmentation).

PROFIBUS is standardized according to IEC 61158/EN 50170. It is an efficient, open and robust fieldbus system with short response times and the following protocols:

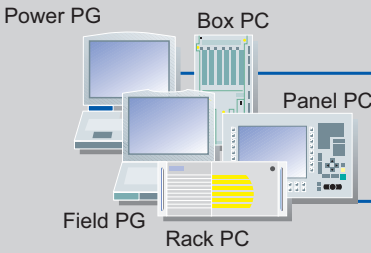
- PROFIBUS DP
  (Distributed Peripherals) is used to connect distributed peripherals, e.g. SIMATIC ET 200 with very fast response times according to the IEC 61158/EN 50170 standard.
- PROFIBUS PA
  (Process Automation) expands PROFIBUS DP with inherently safe transmission according to the international standard IEC 61158-2.

SIMATIC



	Integral interface	Communications processor
S7-300 / S7-400 SIMATIC C7	C7-635/636	CP 342-5/CP 342-5 FO, CP 343-5
	CPU 315F/317F, CPU 414H/417H CPU 416F, CPU 41x -2/3 FM 458-1 DP (isochronous)	CP 342-5/CP 342-5 FO, CP 343-5, CP 443-5 Basic, CP 443-5 Extended IM 467/467 FO
ET 200S / ET 200M / ET 200pro / ET 200eco	CPUs with DP interface	
	IM 151-1, IM 151-1 HF, IM 151-7 CPU, IM 151-7 F-CPU	
	IM 153-1, IM 153-2	
	IM 154-1 DP, IM 154-2 DP HF	
SIMATIC TDC		CP 50M0

SIMATIC PC/PG



Power PG, Box PC, Panel PC, Field PG, Rack PC	Box PC 620/627/840 Rack PC 840/IL40 S Panel PC IL77/670/677/870/877 Field PG Power PGO	CP 5512 CP 5611 A2 CP 5613 A2/CP 5613 FO CP 5614 A2/CP 5614 FO

PC-based Automation

WinAC	WinAC Slot 412/416 (with integral interface), WinAC MP (with integral interface)	
WinAC RTX		CP 5613 A2
WinAC Basis		CP 5611 A2, CP 5613 A2, Integral interface PC/PG

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PROFIBUS DP masters

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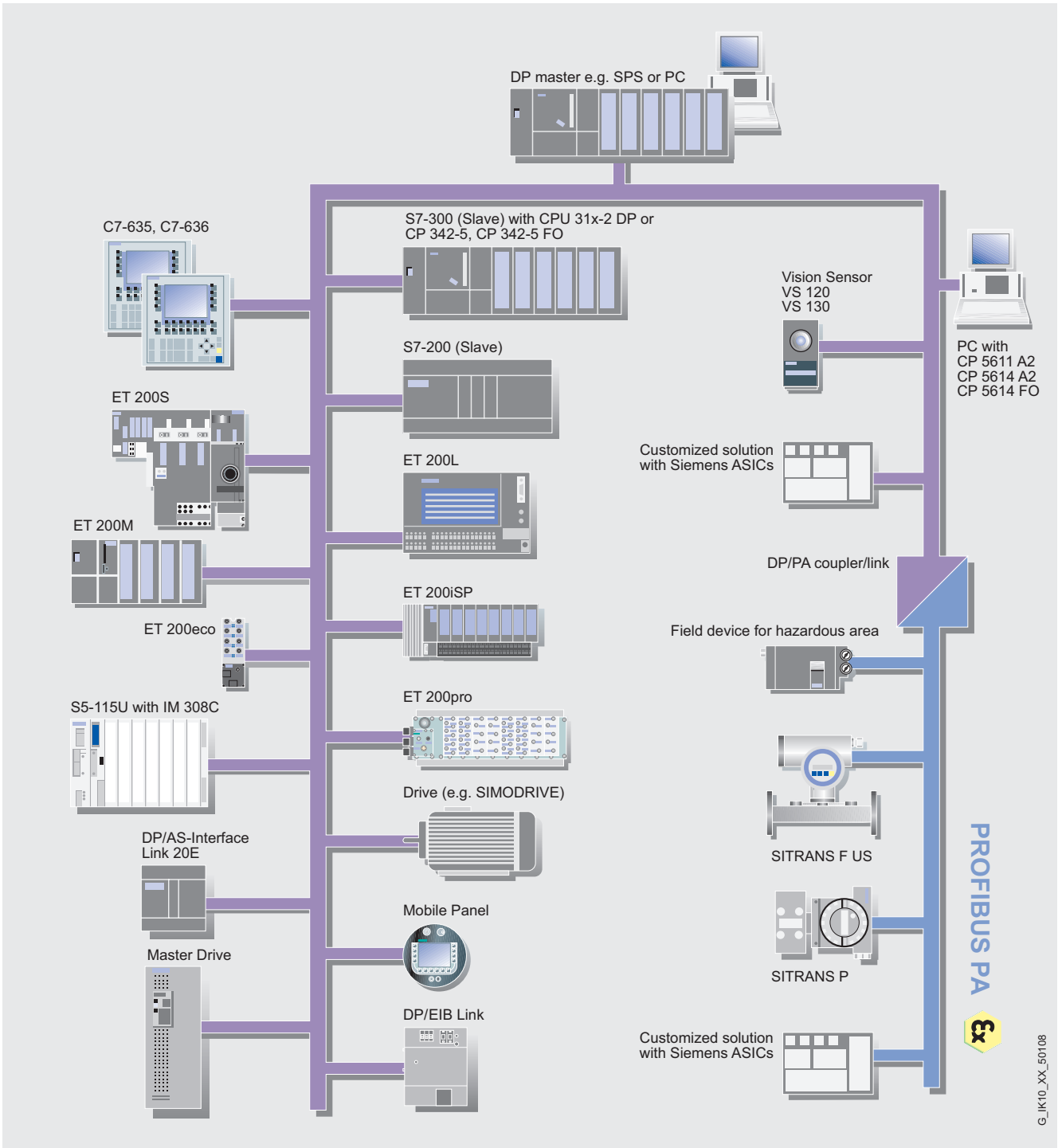
Process or field communication

PROFIBUS DP/PA is used to connect field devices such as distributed I/O stations or operating mechanisms to automation systems such as SIMATIC S7 or PCs.

PROFIBUS DP/PA is selected when I/O stations on a machine or in a plant (e.g. the field level) are widely distributed and can be spatially grouped (>16 inputs/outputs) to form a station (e.g. ET 200).

In this case the actuators/sensors are connected to field devices, which are supplied with output data according to the master/slave principle and send the input data to the controller or the PC.

Powerful tools such as STEP 7 and COM PROFIBUS are available to configure and parameterize the I/O stations. With these tools, tests and start-ups are possible from every connection using PROFIBUS DP.



PROFIBUS DP slaves

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DP device types

PROFIBUS DP differentiates between two different classes of master and various DP functionalities:

- DP master class 1
  The DP master class 1 is the central component of PROFIBUS DP. In a fixed, continuously recurring message cycle the central controller or PC exchanges information with distributed stations (DP slaves).
- DP master class 2
  Devices of this type (programming, configuring or operating devices) are used during start-up, for configuring the DP system or for operating the plant while it is running (diagnostics). A DP master class 2 is able, for example, to read the input data, output data, diagnostics data and configuration data of slaves.
- DP slave
  A DP slave is an I/O station which reads in input information and sends out output information to the other peripherals. The amount of input and output information varies from device to device but is limited to a maximum 244 bytes per device. The functional scope of DP masters class 1 and 2 and of DP slaves can vary. A communications processor can be accordingly efficient and versatile.
- DP-V0
  The DP master functions (DP-V0) are: Configuring, parameterizing, cyclic reading of input data and writing of outputs, and reading of diagnostics data.
- DP-V1
  The additional DP function expansions (DP-V 1) enable acyclic read and write functions and alarm acknowledgment in parallel with the cyclic data traffic. These expanded DP functions also include acyclic access to the parameters and measured values of a slave (e.g. field devices of the process automation, intelligent operating and monitoring devices). Slaves of this type must be supplied with comprehensive parameter data during start-up and while running. The acyclically transmitted data (e.g. parameterizing data) are changed only rarely compared to the cyclic measured values and are transmitted with low priority in parallel with the fast cyclic transfer of useful data. Alarm acknowledgment on the master provides for the assured transmission of alarms from DP slaves.
- DP-V2
  The DP master functions (DP-V2) are: cycle synchronization and cross data traffic between DP slaves.
- Cycle synchronization
  Cycle synchronization is realized through the use of an equidistant cycle signal on the bus system. This cyclic, equidistant cycle is sent as a global control message frame from the master to all stations. Master and slaves can thus synchronize their applications on this signal. For typical drive applications it is necessary for the jitter of the cycle signal to be smaller than 1 µs.
- Cross data traffic between DP slaves
  The publisher/subscriber model is used to implement the cross traffic between slaves. Slaves which are declared to be publishers make available their input data (equivalent to a reply message frame to their own master) to other slaves, the subscribers, for them to read as well. The cross traffic communication takes place cyclically.

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Data communication

Overview

Communication functions

The data communication (e.g. PROFIBUS FMS) is used to exchange data between automation devices or between an automation device and intelligent partners (PC, computer, etc.).

The following communication functions are available for this purpose:

- PG/OP communication
  Includes integrated communication functions by means of which the SIMATIC automation systems can perform data communication with HMI devices (e.g. TD/OP) and SIMATIC PG (STEP 7). PG/OP communication is supported by MPI, PROFIBUS and Industrial Ethernet networks.
- S7 routing
  With the help of the S7 routing function it is possible to use PG communication on an internetwork basis.
- S7 communication
  This integrated communication function was optimized within SIMATIC S7/C7. It also enables the connection of PCs and workstations. The amount of useful data per job is 64 Kbyte. S7 communication provides simple, efficient communication services and a network-independent software interface for MPI, PROFIBUS and Industrial Ethernet networks.
- S5-compatible communication (SEND/RECEIVE)
  The SEND/RECEIVE interface (for PROFIBUS through FDL) is optimized for communication between SIMATIC S5 and S7 controllers and thus enables migration from SIMATIC S5, SIMATIC S7 controllers and PCs through PROFIBUS and Industrial Ethernet.
- Standard communication
  These are standardized protocols for data communication. PROFIBUS FMS (Fieldbus Message Specification) is ideal for the communication of different automation systems (e.g. PLC, PC) from different manufacturers within a cell area with few stations (max. 16). Communication with field devices with an FMS interface is also possible. Using the FMS services READ, WRITE and INFORMATION REPORT, one communication partner can gain reading or writing access to another communication partner's variables through the variable index or variable name or can transmit its own variable values to another communication partner. Partial access to variable values is supported. The communication is handled through acyclic connections (master/master, master/slave), through acyclic connections with slave initiative or through cyclic connections (master/slave). With the INFORMATION REPORT it is possible in addition to send a message to all stations on the network with the help of a broadcast service. The FMS services IDENTIFY (request for the partner's identification characteristics) and STATUS (request for the partner's status) can be actuated as well.
- OPC server
  The basic principle behind OPC (OLE for Process Control) is that OPC client applications communicate on a standardized, open and hence vendor-independent interface with the OPC server. IT communication can be implemented through the OPC XML DA interface. Suitable OPC servers are included in the scope of supply of the corresponding communication software.

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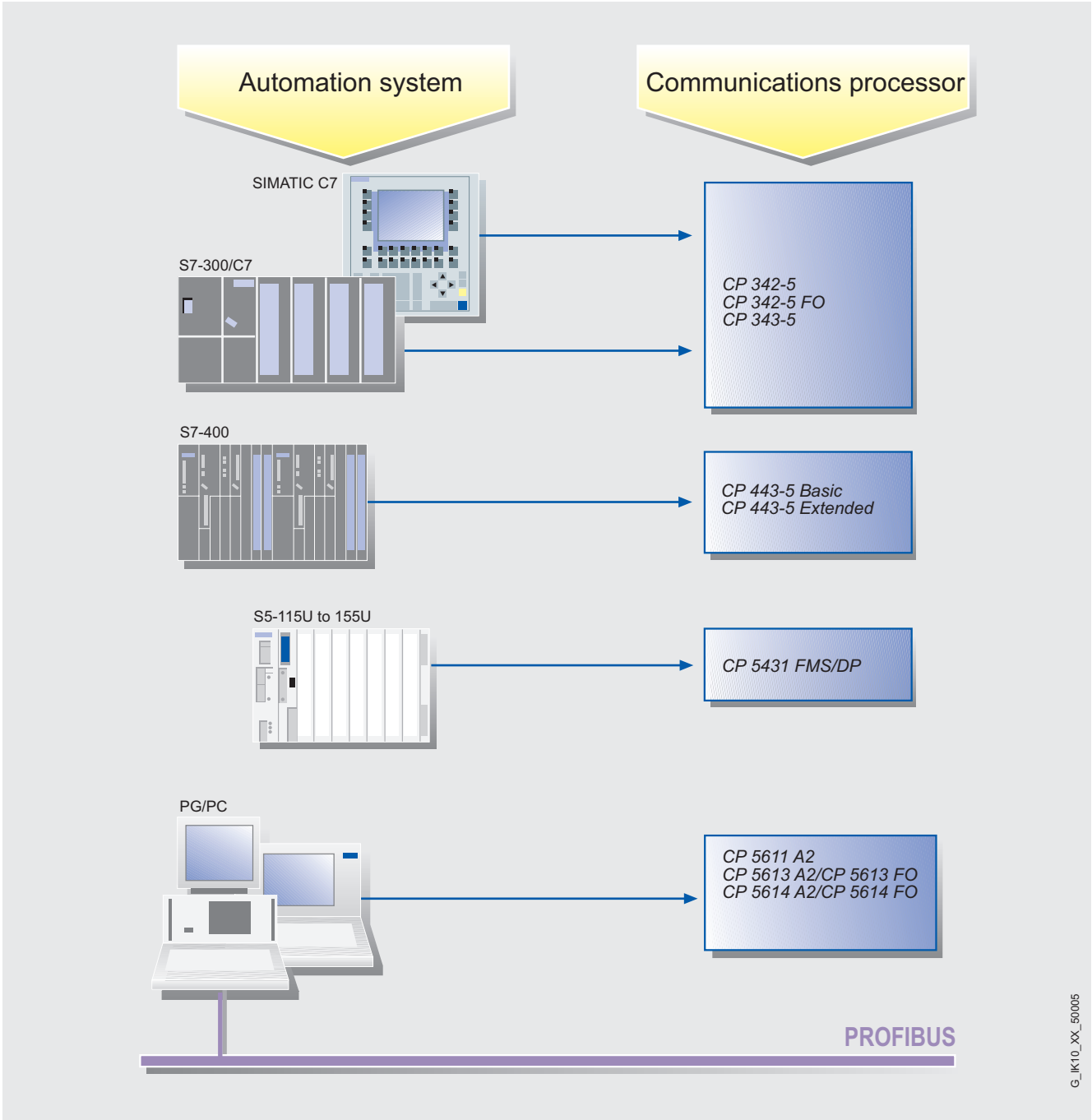
System connections

For many terminal devices that are communication processors (CPs) which have implemented the communication functions in the firmware already and as the result relieve the terminal device of having to perform communication tasks (e.g. flow control, blocking, etc.).



Data communication for SIMATIC and PC

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Topologies

Overview

Siemens offers an extensive range of PROFIBUS network components for electrical and optical transmission technology.

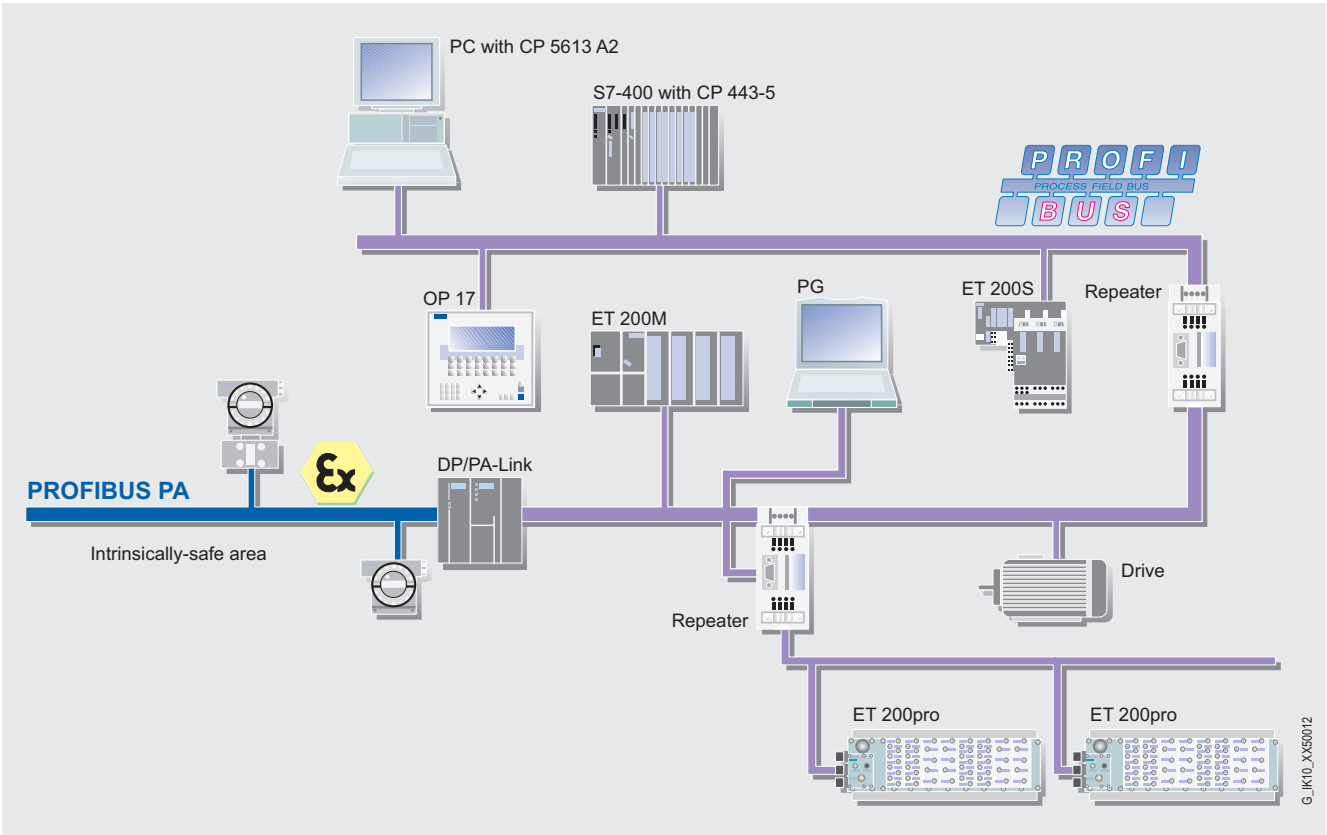
PROFIBUS is standardized according to IEC 61158/EN 50170 for universal automation (PROFIBUS FMS and PROFIBUS DP) and to IEC 61158-2 for process automation (PROFIBUS PA).

Electrical network

- The electrical network uses a shielded, twisted two-wire cable. The RS 485 interface works with voltage differences. It is less sensitive therefore to interference than a voltage or current interface. With PROFIBUS the stations are connected by means of a bus terminal or a bus connector (max. 32 stations per segment).
- The individual segments are connected through repeaters.
- The transmission rate is adjustable in steps from 9.6 kbit/s to 12 Mbit/s.
- The maximum segment length is dependent on the transmission rate.
- The electrical network can be configured as a bus or tree structure.
- The transmission technology according to IEC 61158-2 is used with PROFIBUS PA for applications in the inherently safe area. In this case the transmission rate equals 31.25 kbit/s.

Features

- High-quality bus cable
- Transmission method: RS 485 (according to EIA)
- Bus structure with bus terminals and bus connector for connecting the PROFIBUS stations
- Transmission method according to IEC 61158/EN 50170 for universal automation (PROFIBUS FMS/DP) and according to IEC 61158-2 for the inherently safe area (PROFIBUS PA)
- Conversion of DP transmission from RS 485 (bit coding through voltage difference signals) to IEC 61158-2 (bit coding through current signals) takes place through the network components (DP/PA coupler or DP/PA link)
- Simple, consistent mounting and grounding concept
- Easy installation



Network configuration as electrical PROFIBUS network

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Optical network

The optical conductor variant of PROFIBUS has the following features:

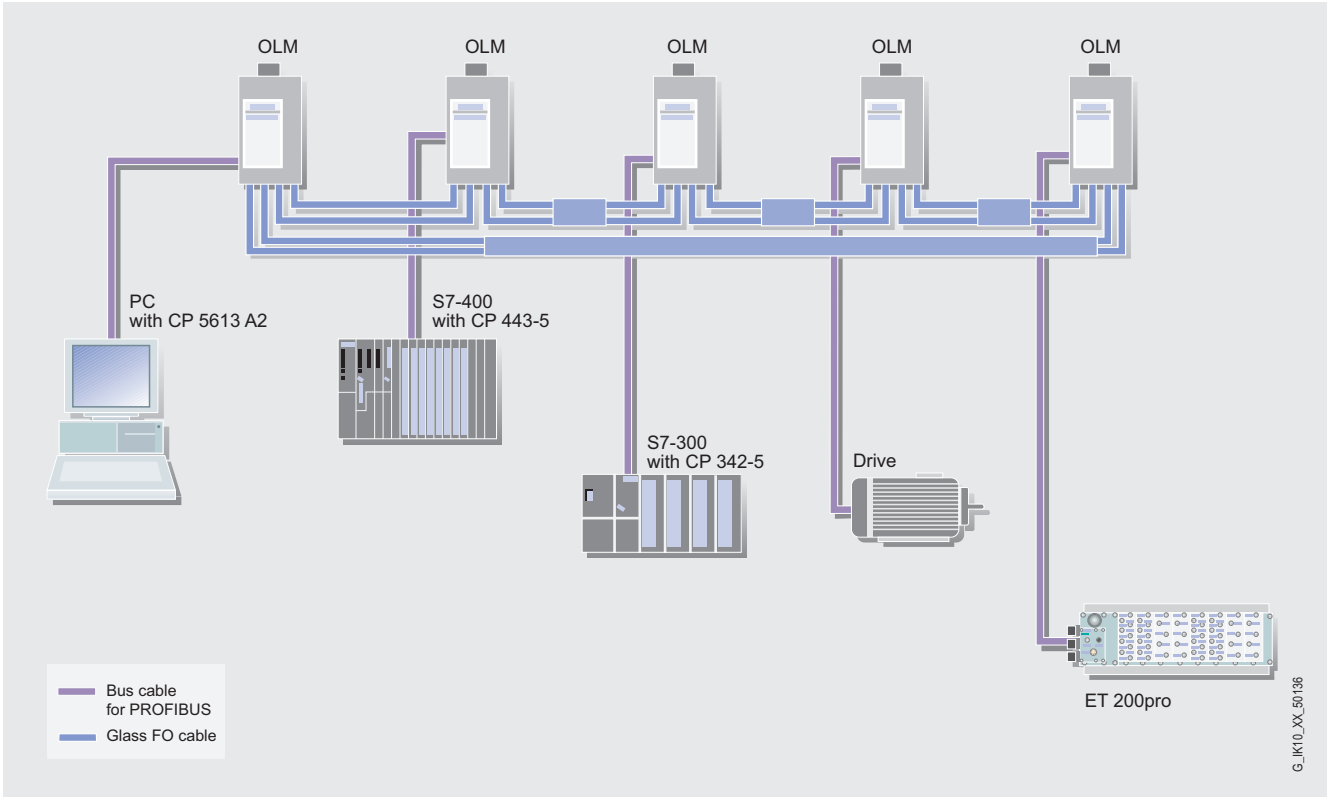
- Transmission path is insensitive to electromagnetic interference
- Suitable for long ranges
- Electrical isolation
- Uses either plastic or PCF or glass optical conductors

Optical PROFIBUS with OLMs

Using optical link modules (OLMs) it is possible to configure an optical network as a line, ring or star structure. The maximum distance between two OLMs can be 15 km. The transmission rate is adjustable in steps from 9.6 kbit/s to 12 Mbit/s.

Optical PROFIBUS with integrated interface and OBT

The optical PROFIBUS with integrated interface and OBT is configured as a line structure. A cost-optimized solution in the form of devices with an integrated optical interface is available for this purpose. Terminal equipment with an RS 485 interface can be connected through an optical bus terminal (OBT). The maximum distance between two stations on a plastic optical conductor is 50 m. Special optical conductors are used to span distances of up to 300 m.



Network configuration of the optical PROFIBUS with OLMs

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Topologies

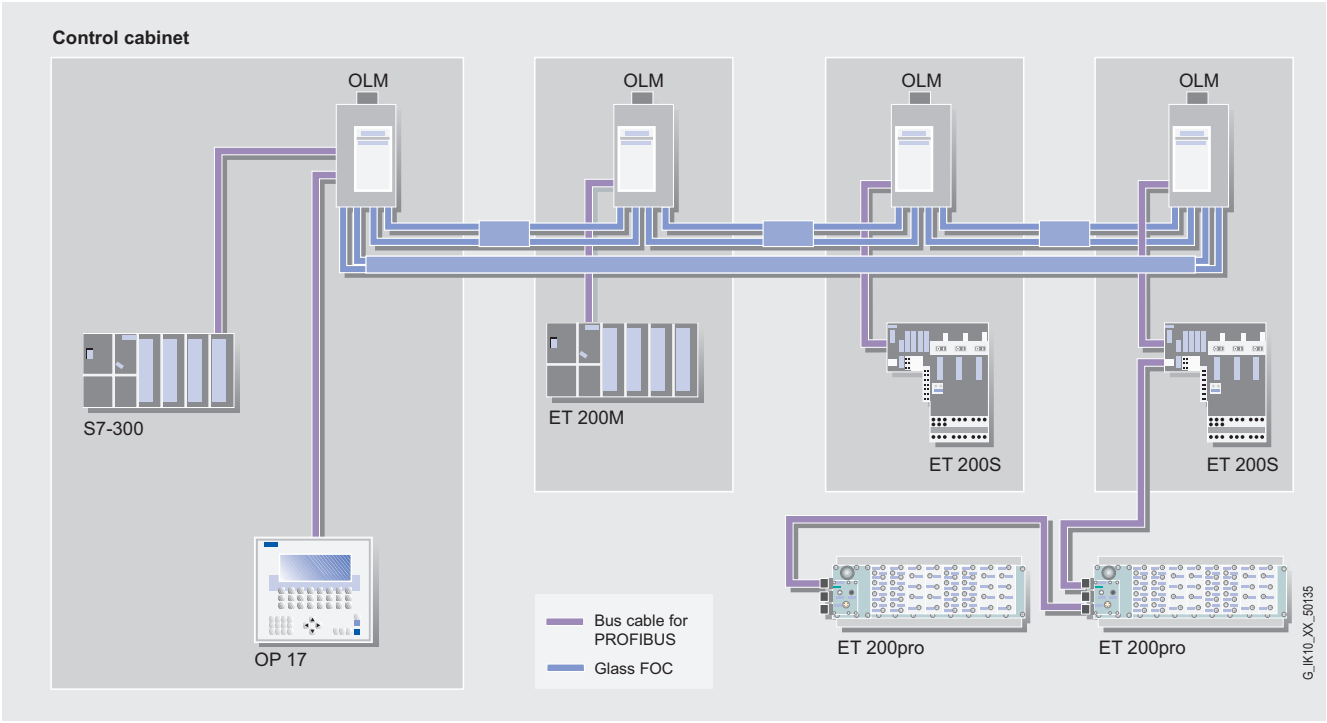
Mixed network

Mixed structures consisting of an electrical and an optical network are possible. The transition between the two media is effected by an OLM.

In the way stations on the bus communicate with each other there is no difference between two-wire technology and fiber optic technology. Up to 127 stations can be connected to one PROFIBUS network.

Optical transmission technology provides the following advantages:

- Optical conductors made of plastic or glass are insensitive to electromagnetic radiation, hence the EMC measures required for electrical networks are superfluous
- No additional lightning protection concept is needed outdoors
- The potentials on the modules are automatically isolated thanks to the conductor characteristics
- With optical conductors it is possible to span large distances to field devices



Network configuration with an electrical and an optical PROFIBUS combined

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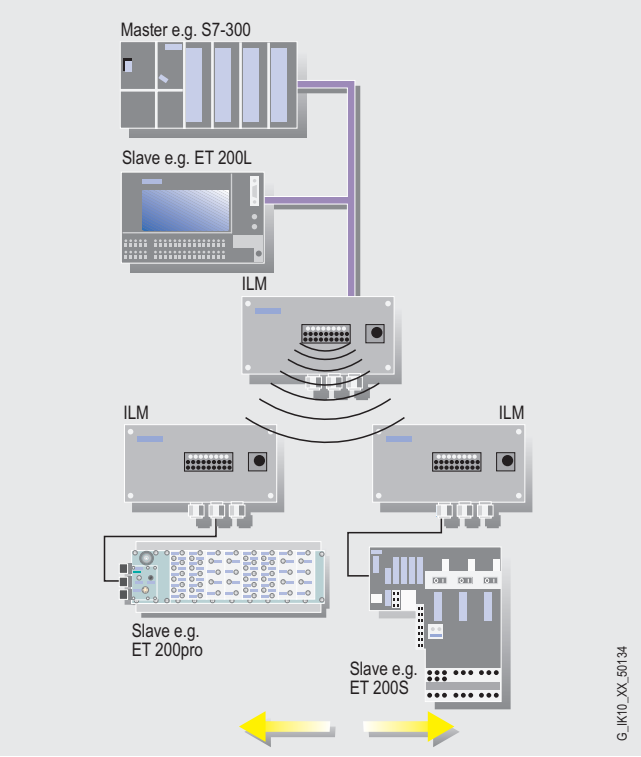
Wireless coupling

With the help of the PROFIBUS infrared link module (ILM), one or more PROFIBUS slaves or slave segments can be coupled by wireless means. With a maximum transmission rate of 1.5 Mbit/s and a maximum range of 15 m, communication with moving parts, e.g. automatic guided vehicles (AGVs) or the replacement of wear-prone systems (sliprings or slipring leads) is possible.



Coupling with moving stations

More information

For the SIMATIC NET products referred to above (order numbers 6GK..., 6XV1...) please also note the conditions of application, which can be consulted on the Internet site quoted below.

You can find more information on the Internet at:

http://www.siemens.com/simatic-net/ik-info

More information about PROFIBUS can be found in Catalog IK PI, in the chapter *PROFIBUS according to IEC 61158 / EN 50170.*

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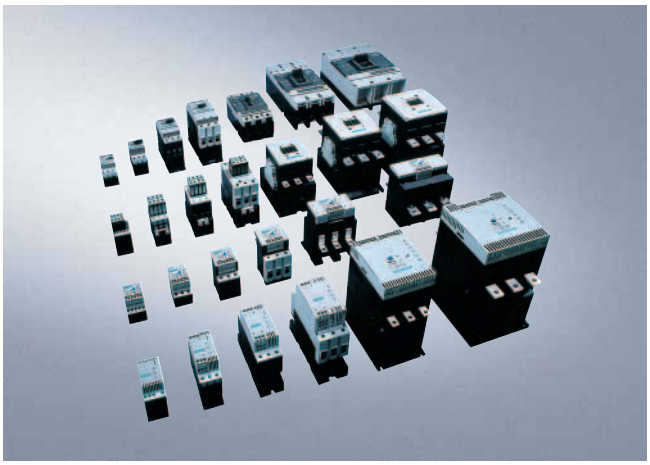
System overview

Overview



A perfect team: The SIRIUS modular system for the control cabinet

Building switchgear cabinets should be quick, easy, flexible and space-saving. But how can all these requirements be met simultaneously? The answer lies in the unique SIRIUS modular system, where you will find everything that you need for switching, protecting and starting motors and industrial systems.

This modular selection of standard components covers the range up to 250 kW / 400 V in just seven sizes which are optimally coordinated, can be combined with ease and use the same accessories. Control technology can be that simple.

Continuous further development and regular innovations ensure that our customers are optimally equipped with SIRIUS and benefit from efficient solutions - today and tomorrow.

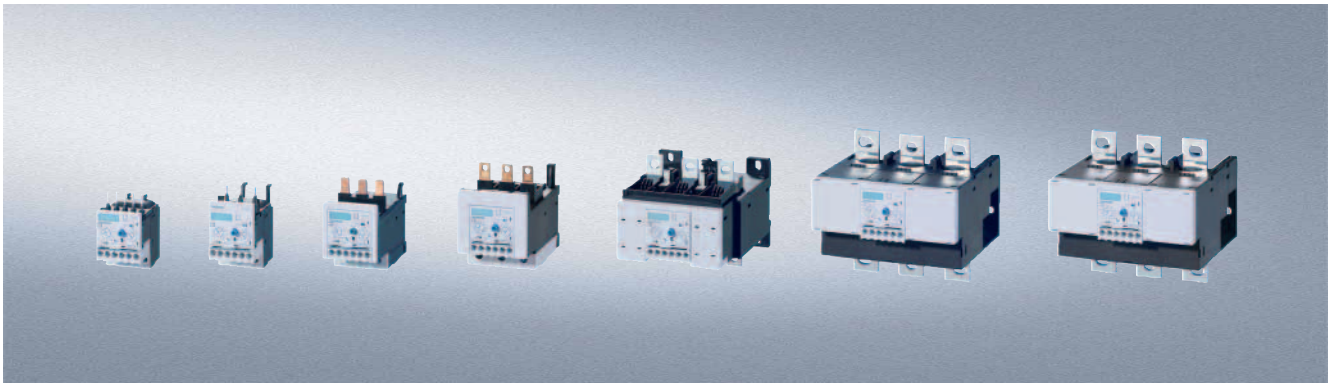
All components of the SIRIUS modular system are characterized by a space-saving design and high flexibility. Configuring, installing, wiring and maintenance are extremely easy and time-saving to perform.

Regardless of whether you want to build up load feeders with motor starter protectors or overload relays, contactors or soft starters, SIRIUS has the right product for every application.

SIRIUS stands for innovation

To be able to meet our customers' requirements tomorrow as well as today we are dedicated to the ongoing development of our product portfolio.

The new 3RB2 solid-state overload relays



With the newly developed SIRIUS 3RB2 solid-state overload relays for both standard and high-feature requirements it is now possible to provide motor and system protection over the full range from 0.1 to 630 A. Thanks to the large setting range it is possible, furthermore, to cover this current range with a minimum number of variants, which compared to the "classic" bimetal relays has been reduced by up to 90 %. And this variance can be minimized further by the modular design of the devices for high-feature requirements. With these devices for full motor protection it is possible to transmit alarm signals, current values and the like, e.g. for further processing in the PLC.

The SIRIUS 3RB2 solid-state overload relays are coordinated with the other components of the SIRIUS modular system with regards to their electric rating, mechanics and dimensions.

The SIRIUS 3RB2 solid-state overload relays reduce stock and product variance, simplify configuring, mounting and start-up, increase plant availability and enable customized solutions.

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The new SIRIUS 3RW40 soft starters – for soft starting up to high ratings

Two new types of soft starter in compact SIRIUS design provide the answer for the starting of three-phase asynchronous motors with reduced strain on the load and the network. The new SIRIUS 3RW40 soft starter is used in demanding standard applications. The SIRIUS 3RW44 soft starter is the right choice for high functionality and for difficult starting operations.

For simple to demanding standard applications in which a wye-delta starter has been used up to now, the SIRIUS 3RW40 soft starter provides the best solution for starting applications with zero torque surge. With a power range from 75 to 250 kW (at 400 V) the new SIRIUS 3RW40 soft starters supplement the existing, service-proven product segment of the 3RW30 soft starters with 2-phase control. The use of 2-phase controlled soft starters up to this high performance range is unique and was made possible by a new control method which was specially developed by Siemens.

For motor starts with more exacting requirements, which up to now had to be implemented with a frequency converter for example, the SIRIUS 3RW44 soft starter provides the greatest functionality and diagnostics with user-friendly operation. For integration in the process landscape the new 3RW44 high feature soft starter can be retrofitted with an optional PROFIBUS DP module. Thanks to its new torque control the SIRIUS 3RW44 soft starter is a master of difficult starting and ramp-down operations for operating mechanisms covering a performance range up to 710 kW at 400 V with an inline circuit (up to 1200 kW at 400 V with an inside-delta circuit).

Benefits

The advantages and highlights at a glance

- *Load feeders*
  Easy to implement up to 250 kW / 400 V from standard devices
- *Modular design*
  Everything fits together and can be combined
- *Variants and sizes*
  Economical and flexible thanks to seven compact sizes
- *Accessories*
  Optimum variance with uniform accessories
- *Construction*
  Space-saving design with small device width and butt-mounting type of construction up to 60 °C
- *Installation*
  Fast start-up, short setting-up times and simple wiring
- *Communication*
  Connection to AS-interface and PROFIBUS DP possible
- *Maintenance*
  Extremely long life, low maintenance and reliable
- *Approvals*
  Global approvals and certifications such as IEC, UL, CSA, CCC, shipbuilding
- *Mounting*
  Permanently secure mounting, screwed or snap-fitted
- *Spring-type terminals*
  Quick and secure connection, vibration-proof and maintenance-free
- *Service*
  Short delivery periods thanks to world-wide logistics network
- *Environment*
  Environment-friendly production and materials, recycling capability, low power loss
- *Design*
  Clear-cut, ergonomic design
  (winner of the iF Product Design Award)

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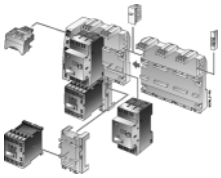
More information

Product	For further information see
Robust and reliable: SIRIUS 3RT contactors	
Thanks to the extreme robustness and best contact reliability of our contactors, their switching is extremely precise and reliable. At the same time they enable you to build compact control cabinets with a high packing density because the auxiliary switch blocks and coil circuits are inside the contactor's contours. This facilitates expansions and saves a great deal of space in the control cabinet.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Controls / Contactors and Contactor Assemblies* • Chapter *Controls – Contactors and Contactor Assemblies*
Much more than ON/OFF: the SIRIUS 3RV motor starter protectors	
The SIRIUS 3RV motor starter protectors are compact, current limiting motor starter protectors. They ensure reliable shutdown in the short-circuit case and protect loads and the system from overloads. In addition they are suitable for normal switching duty with loads that have a small number of switching operations as well as for reliable isolation of the equipment from the supply system for maintenance work or modifications.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Protection Equipment / Motor Starter Protectors up to 100 A* • Chapter *Protection Equipment*
Triggering when things get serious: SIRIUS 3RU and 3RB overload relays	
The overload relays of the SIRIUS family are available in a thermal version as well as in a solid-state version for high-feature applications. They are responsible in the main circuit for the current-dependent overload protection of loads and the other switching and protective devices in the respective load feeder.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Protection Equipment / Overload Relays* • Chapter *Protection Equipment*
Soft starting and ramp-down: SIRIUS 3RW soft starters	
The 3RW soft starters offer a complete range covering all standard and high-feature motor starting applications. As the result, the advantages of soft starting and ramp-down can be used today in a wide range of applications for realizing optimum machine concepts with greater ease and lower cost.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters / 3RW Soft Starters* • Chapter *Load Feeders, Motor Starters and Soft Starters*
Everything ready for immediate use: with factory-wired SIRIUS load feeders	
Load feeders start loads by means of a combination of protective and switching functions. This requires a wide selection of different components in order to be able to realize all starter types. To keep downtimes as short as possible, Siemens offers factory-wired starter solutions.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters* • Chapter *Load Feeders, Motor Starters and Soft Starters*
SIRIUS infeed system	
 When you want to supply current to several motor starter protectors in a group or to complete load feeders, all arguments are in favor of using the user-friendly SIRIUS infeed system. Thanks to a terminal block it is also possible to integrate single-pole, two-pole or three-pole components.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters / 3RA Fuseless Load Feeders* • Chapter *Load Feeders, Motor Starters and Soft Starters*